SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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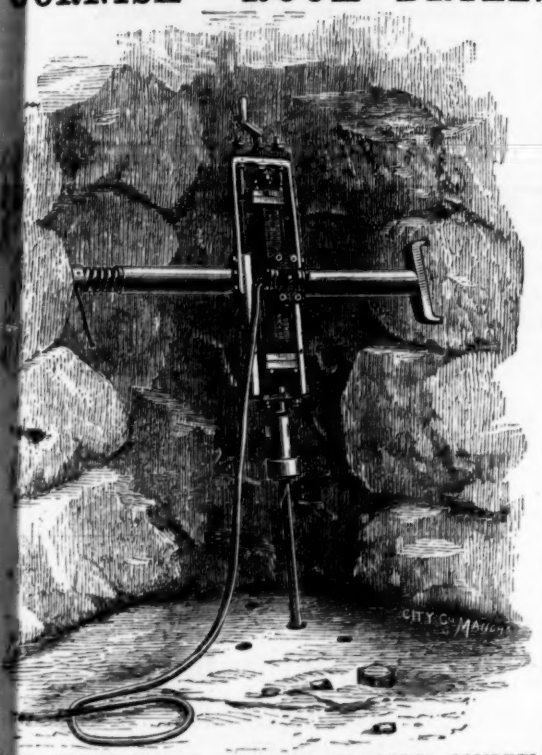
No. 2532.—VOL. LIV. LONDON, SATURDAY, JULY 19, 1884. PRICE (WITH THE JOURNAL) SIXPENCE BY POST £1 4s. PER ANNUM.

FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC —Highest Award for Effectiveness in Boring, and Economy in the Consumption of Air.
JUBILEE EXHIBITION, 1882.
THE PATENT
"CORNISH" ROCK DRILL.



FIRST SILVER MEDAL AWARDED AT BORING COMPETITION, DOLCOATH MINE, 1881.

The "CORNISH" ROCK DRILL and "CORNISH" COMPRESSOR
Are now largely in use, and in every case are giving entire satisfaction.
For Testimonials, Illustrated Catalogues and prices, apply to—
HOLMAN BROTHERS,
CAMBORNE FOUNDRY,
SOLE MAKERS OF
MICHELL & TREGONING'S PATENT PULVERISER, and HOLMAN'S IMPROVED STEAM or AIR PUMPING and WINDING ENGINE for Underground Quarries or Shallow Mining. Indispensable for Shaft Sinking with Rock Drills. Also makers of all kinds of MINING MACHINERY at
THE CAMBORNE FOUNDRY AND ENGINE WORKS,
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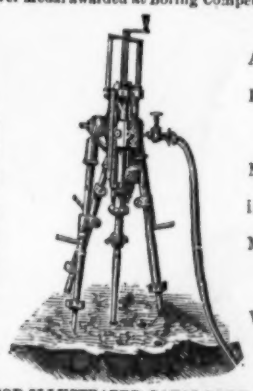
THE PATENT
"ECLIPSE" ROCK-DRILL
AND
"RELIANCE" AIR-COMPRESSOR.
First Silver Medal awarded at Boring Competition, East Pool Mine, Sept. 1883.

SILVER MEDAL—PARIS, 1878 — HIGHEST AWARD



Are NOW SUPPLIED to the ENGLISH, FOREIGN, and COLONIAL GOVERNMENTS, and are also IN USE in a number of the largest MINES, RAILWAYS, QUARRIES, and HARBOUR WORKS in GREAT BRITAIN and ABROAD.

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EITHER
MUNTZ'S OR GREEN'S PROCESS
MUNTZ'S METAL COMPANY (LIMITED),
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NEAR BIRMINGHAM.
LONDON AGENTS—CHARLES MOSS and Co., 1, Rood Lane, London, E.C.

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"INGERSOLL ROCK DRILL."
MEDALS AND HIGHEST AWARDS
SEVEN YEARS IN SUCCESSION,
FOUR IN ONE YEAR.

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Leeds Exhibition, 1875.
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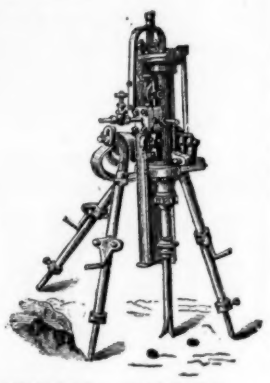
Rio de Janeiro Exhibition, 1875.
Australia Brisbane Exhibition, 1876.
Philadelphia Exhibition, 1876.
Royal Cornwall Polytechnic, 1877.
Mining Institute of Cornwall, 1877.
Paris Exhibition, 1878.



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AUTOMATIC FEED
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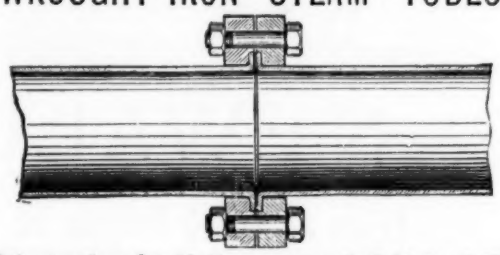

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Stone Breakers and Grinding Machinery.

CAUTION TO PURCHASERS.

Do not buy any Stone Breaker or Pulverising Machines until you have seen ours. Price Lists and Testimonials free on application.
A Machine as will break 40 tons per day for £45.
MACHINES LET OUT ON HIRE, OR ON THE HIRE SYSTEM.
Apply S. MASON and Co.,
STONE MACHINE WORKS, LEICESTER, ENGLAND.

MACHINES MADE WITH SECTIONAL FACED JAWS, OR ANY OTHER.

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FOR
HAND AND POWER.

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With R. SCHRAM'S Patent
Inlet and Outlet Valves.
BOILERS, TURBINES.

SCHRAM'S IMPROVED
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1600 in Use in all Parts of the World.

Complete Rock Boring Plants of the most approved construction for Railway Tunnels, Quarries, Shaft Sinking, Level Driving, Stoping, and Submarine Blasting.

All Kinds of Mining Machinery.

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LATE
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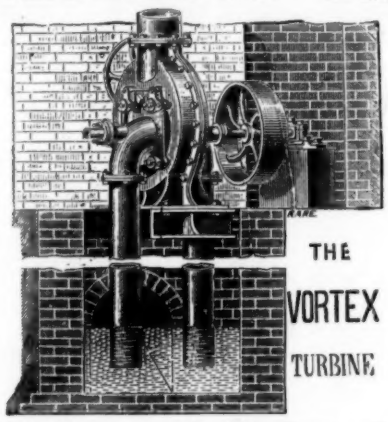

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A most efficient means of applying Water Power to all kinds of Machinery.

Largely used in DRIVING AIR COMPRESSORS, PUMPING, WORKING ORE-CRUSHING MACHINERY, and for other purposes in connection with MINING.
Successfully used in ELECTRIC LIGHTING, and in utilising DISTANT WATER POWER by means of ELECTRICITY.

A Pamphlet containing a full description of the Vortex, with several Illustrations and a number of Testimonials, can be obtained on application.

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CENTRIFUGAL PUMP
Is the only Pump from which the disc can be removed by breaking the joint on a single face only.
Manufactured by CHARLES L. HETT,
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Maker of
IMPROVED CENTRE VENT TURBIN WATER WHEELS,
Horse, Steam and Wind Power PUMPS.

Catalogues on Application.
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BELL'S ASBESTOS.

BELL'S PATENT ASBESTOS BLOCK PACKING for High-Pressure Engines.
The following testimonials refer to this Packing:—

New Zealand Shipping Co. (Limited),
S.S. "Ruapehu," Royal Albert Dock, 19th May, 1884.

Bell's Asbestos Works, Southwark.

GENTLEMEN,—I beg to state that your round Asbestos Block Packing was used in the high-pressure pistons of this ship with the following remarkable results:—

14,000 miles continuous steaming without renewal.
Steam pressure ... ... 110 lbs.
Vacuum ... ... 29 inches.

My experience does not show an equal result from any other packing. The voyage from New Zealand to Plymouth was accomplished in 37 days 23 hours, being the fastest run from New Zealand on record. Yours obediently, D. HENDERSON, Chief Engineer, S.S. "Ruapehu."

Manchester, Sheffield, and Lincolnshire Railway—Steamship Department,
Grimsby, April 10th, 1884.

DEAR SIR,—I have much pleasure in stating that after a trial of over nine months, and comparing it with other packings, I can confidently recommend your Asbestos Packing. It is especially valuable when high-pressures are employed, as in cases where other packings have perished, owing to high temperatures, your packing has invariably stood well. I have also used it with complete success when a gland has heated with other packings, and also in cases of badly scored piston rods. I consider the results I have obtained by its use for our marine engines to have been in every way highly satisfactory. Yours truly,

G. H. CLARKE, Sup. Engineer.

Mr. J. Bell.

Department of the Director of Navy Contracts,
Admiralty, Whitehall, 20th June, 1884.

SIR,—I have to inform you that your tender has been accepted for Bell's Rolled Cloth Asbestos Packing to sample submitted:—Elastic core ... ... Square.
" " ... ... Round.

To Mr. John Bell. JOHN COLLETT, Director of Navy Contracts.

The Patent Block Packing is square, as Fig. 1 and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlaid. As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears the trade mark.

BELL'S ASBESTOS BOILER PRESERVATIVE.—This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that ⅛ in. thick of incrustation causes a waste of 15 per cent. of coal; ¼ in., 60 per cent.; ½ in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler, and covers its own cost a hundredfold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

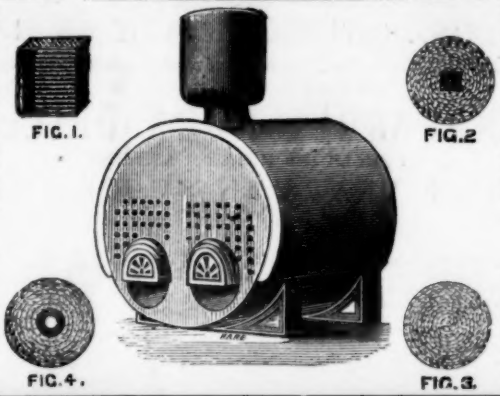
BELL'S ASBESTOS YARN and SOAPSTONE PACKING
for Locomotives and all Stationary Engines running at very high speed with intense friction. Sandwell Park Colliery, Smethwick, 1st February, 1884.

To Bell's Asbestos Works.

DEAR SIRS,—I have much pleasure in stating that I have used your Asbestos Packing for the last 13 months for our large winding engines which are running night and day, and also for the fan, pumping, and hauling engines at the above Colliery, and during that period we have not used more than one-third the Packing we had formerly; and this I attribute to your Packing on account of its great durability and general excellence of quality.—I am, dear Sirs, yours faithfully,

THOMAS WINTER, Colliery Engineer.

BELL'S ASBESTOS.
The goods of this house are of the highest quality only, and no attempt is made to compete with other manufacturers by the supply of inferior materials at low prices. All "home" orders should be sent direct to the undermentioned depôts and not through Agents or Factors.



BELL'S ASBESTOS BOILER AND PIPE COVERING COMPOSITION
coating every class of steam pipes and boilers, non-combustible and easily applied when s is up; adheres to metals and preserves them from rust; prevents the unequal expansion and traction of boilers exposed to weather; covers 50 per cent. more surface than any other coat and is absolutely indestructible. It can be stripped off after many years' use, mixed up with 2 cent. of fresh, and applied again. The composition is supplied dry, and is only to be mixed water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—

Temperature on Plates - - - 186 deg.
" " Covering - - 94 deg.

One ton of coal was saved per week, and although the fire was raked out every even 20 lbs. of steam were found in the boiler next morning.

The following Testimonials refers to this Covering:—

Offices of the Wimbledon Local Board, Wimbledon, Nov. 28th, 1883.

DEAR SIR,—It may interest you to know that we save exactly 40 per cent. in fuel thro using your covering. Yours truly, W. SANTO CRIMP, C.E., F.G.S.

The Tamar and Kit Hill Granite Company (Limited),
Gunnislake, Tavistock, 8th April, 1884.

Mr. John Bell, Southwark, S.E.

SIR,—I have much pleasure in stating that the Asbestos covering applied by you to the b of our travelling crane at Kit Hill has yielded most remarkable results. Since it has been in we have saved fully half our coals, and have effected a great saving in the time it takes to ge steam, which is often a matter of great importance to us. I should add that the crane run high gantries, and is fully exposed to all weather. I have formed the highest opinion of Asbestos as used for this purpose, and as you are aware, have had another boiler similarly cove though it has not since been used. I can most strongly recommend the material.

I am, Sir, yours faithfully, W. J. CHALK, Assoc.M.Inst.C.E., Engineer and Manag

BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE SHEETING, for making every class of Steam and Water Joints. It can be bent hand to the form required without puckering, and is especially useful in ma joints of manhole and mudhole doors. It is kept in stock in rolls of 100 ft., ⅛ in. to 3 in. wide, and any thickness from ⅛ in. upwards. Manhole covers ca lifted many times before the renewal of the jointing material is necessary. The material is made up into sheets about 40 in. square, and each sheet bears the Trade M without which none is genuine. It is very necessary to guard against imitatio this useful material, and to secure themselves against being supplied with inferior articles at my price, users are recommended to see that every 10 ft. le of the Asbestos Tape purchased by them bears the Trade Mark.

BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOA
for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toug and purity, and is absolutely free from the injurious ingredients frequently us attain an appearance of finish, regardless of the real utility of the material. Ma sheets measuring about 40 in. square, from 1-64th in. to 1 in., and ½ millimet 25 millimetres thick. Each sheet bears the Trade Mark.

The following copy of acceptance of tender refers to above:—

Department of the Director of Navy Contracts.
Admiralty, Whitehall, S.W., 17th May, 18

SIR,—I have to inform you that your tender for Asbestos Millboard has accepted.—Mr. John Bell. JOHN COLLETT, Director of Navy Contra

BELL'S ASBESTOS EXPANSION SHEETING (PATENT).
Sheeting is another combination of Asbestos with India-rubber, giving to the user the special advantages of both materials. The India-rubber Washer is pro from the action of heat and grease by an outer coating of vulcanised Asbestos thus producing an excellent joint where expansion and contraction render materials unserviceable. This material is admirably suited to steam pipe joint every class of valve. Valves made of this material are very durable, as they a subject to injury by oil.

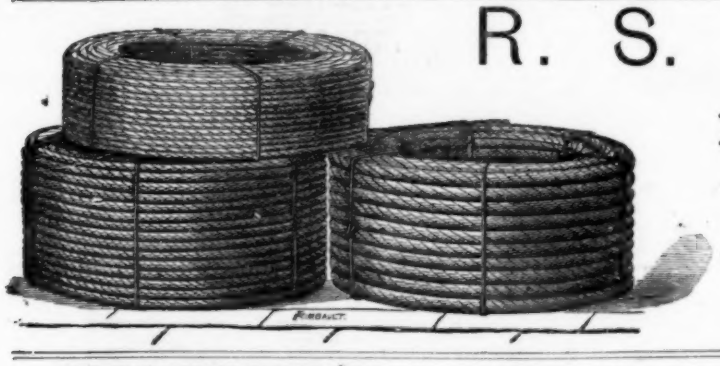
BELL'S "ASBESTOS LUBRICANT." REG

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

BELL'S ASBESTOS WORKS, SOUTHWARK, LONDON, S. E.

OR THE DEPOTS—118a, SOUTHWARK STREET, S.E.,

Victoria Buildings, Deansgate, MANCHESTER. 11 and 13, St. Vincent Place, GLASGOW. 39, Mount Stuart Square, CARDIFF. 21, Ritter Strasse, BERLIN



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Sole Patentees of Untwisted Wire Rope.

Iron & Steel Ropes of the highest quality for Collieries, Railways, Suspension Bridges, &c.

PATENT STEEL FLEXIBLE ROPES AND HAWSERS.
IRON STEEL, AND COPPER CORDS. LIGHTNING CONDUCTORS.
COPPER CABLES of high Conductivity for Electric Light and Power.

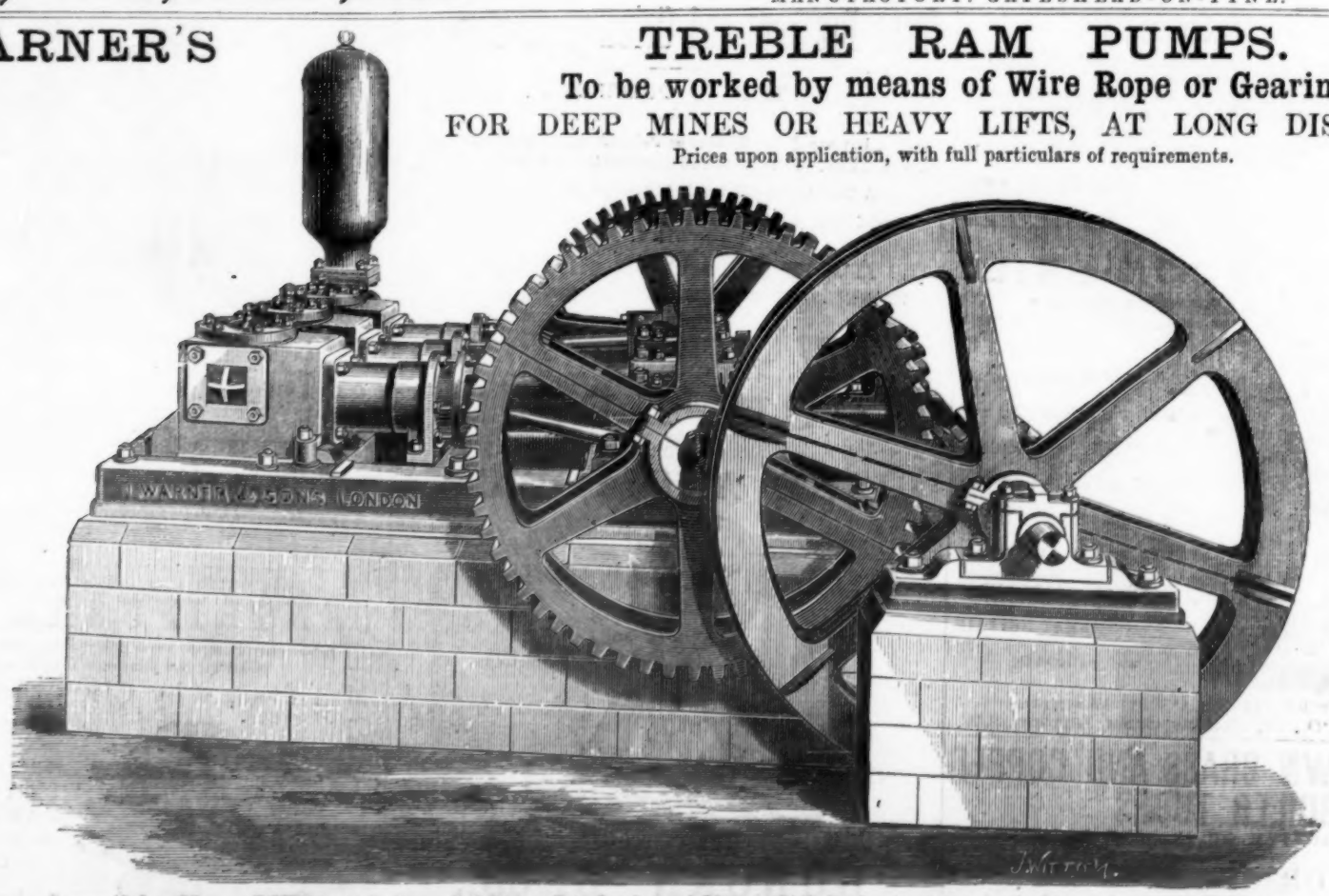
London: 130, STRAND, W.C. Liverpool: 7, NEW QUAY.
Glasgow: 68, ANDERSTON QUAY.
MANUFACTORY: GATESHEAD-ON-TYNE.

WARNER'S TREBLE RAM PUMPS.

To be worked by means of Wire Rope or Gearing.

FOR DEEP MINES OR HEAVY LIFTS, AT LONG DISTANCES.

Prices upon application, with full particulars of requirements.



As supplied to Messrs BOWES, of Springwell Colliery, Gateshead, for a Lift of (600) Six hundred feet vertical through two miles of pipes.

JOHN WARNER AND SONS, THE CRESCENT FOUNDRY, CRIPPLEGATE, LONDON, E.C.

R. HUDSON'S

Patent Steel Trucks, Points and Crossings,

PORTABLE RAILWAY, STEEL BUCKETS, &c., &c.

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In connection with the Leeds Exchange, and all the principal Hotels and places of business in the town.

GILDERSOME FOUNDRY, NEAR LEEDS.

(Near Gildersome Station, G.N.R. Main Line, Bradford to Wakefield and London, via Laisterdyke and Ardsley Junctions.)

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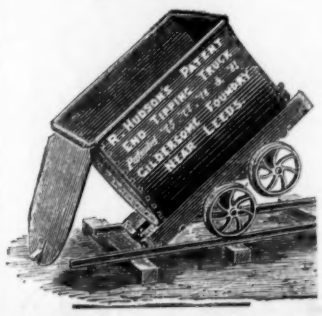
UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the LIGHTEST, STRONGEST, and most CAPACIOUS made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

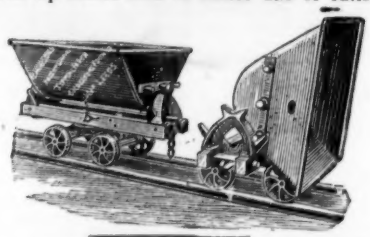
Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.
N.B.—The American, Australian, Indian, and Spanish Patents on Sale.

CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.

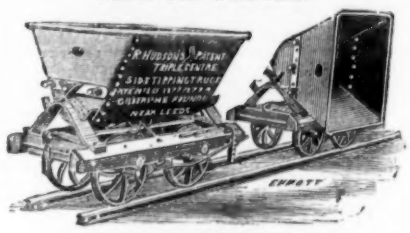
1.—PATENT STEEL END TIP WAGONS.



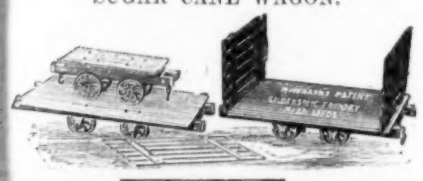
2.—PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.



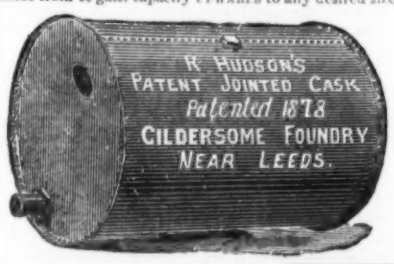
3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.



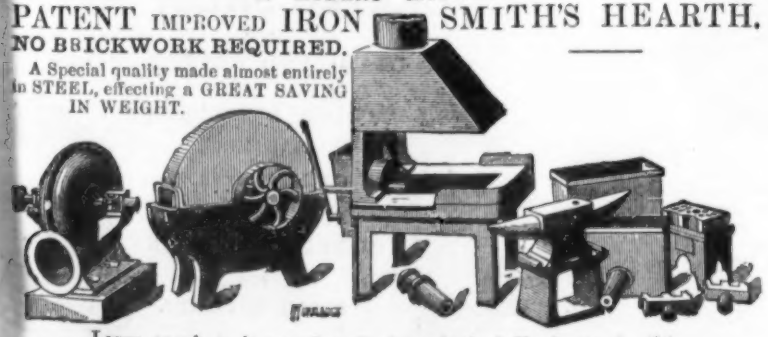
4.—PATENT STEEL PLATFORM OR SUGAR CANE WAGON.



5.—PATENT STEEL CASK.
As supplied to H.M. War Office for the late war in Egypt).
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.
(Made from 10 gals. capacity UPWARDS to any desired size.)



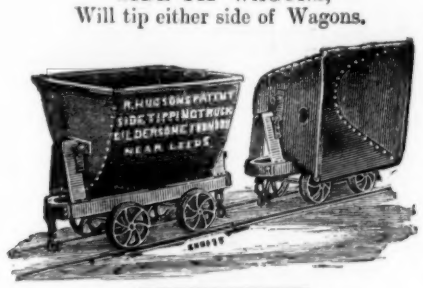
6.—ROBERT HUDSON'S
PATENT IMPROVED IRON SMITH'S HEARTH.
NO BRICKWORK REQUIRED.
A Special quality made almost entirely in STEEL, effecting a GREAT SAVING IN WEIGHT.



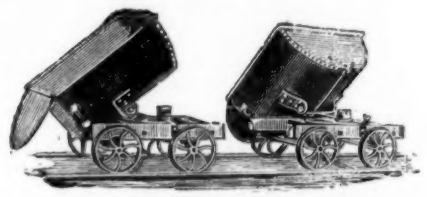
Large numbers in use by all the principal Engineers in this country and abroad.

7.—PATENT STEEL MINING WAGONS.

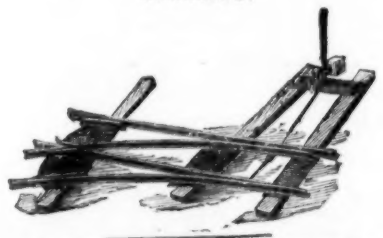
8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS,
Will tip either side of Wagons.



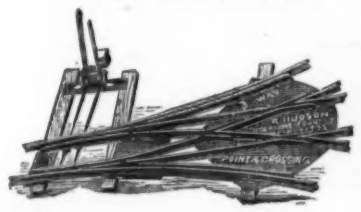
9.—PATENT STEEL ALL-ROUND TIP WAGON.



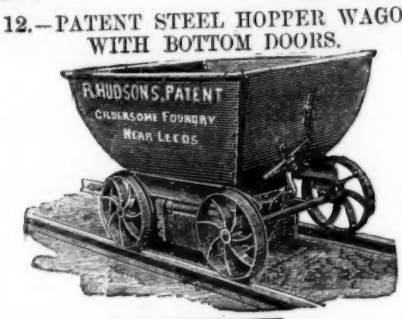
10.—LEFT-HAND STEEL POINT AND CROSSING.



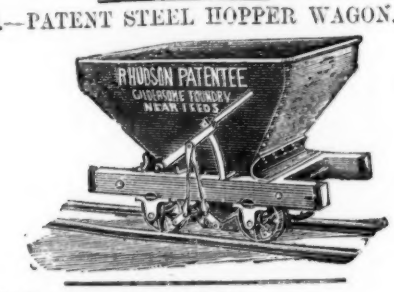
11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.



12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.

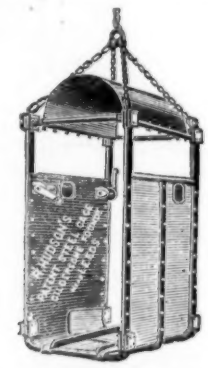


13.—PATENT STEEL HOPPER WAGON.



14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF ACTING if desired.)

15.—STEEL CAGE.



16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
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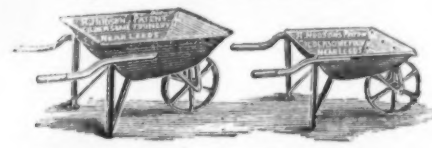

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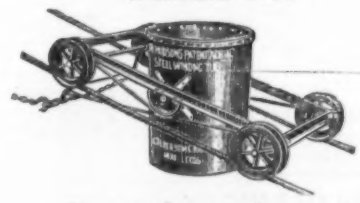

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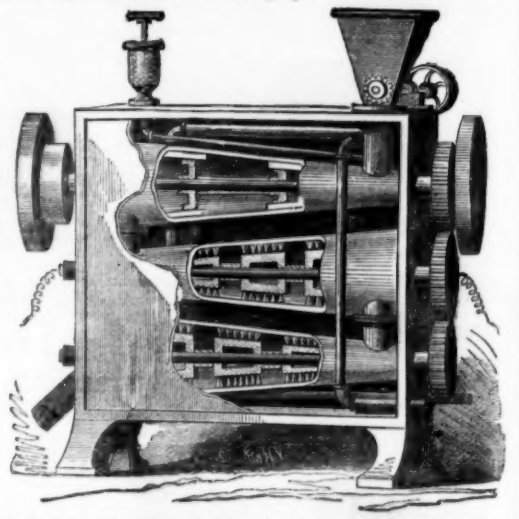
PROFESSOR JAMES MANES AND SONS call the attention of miners, mineowners, capitalists, and others interested in the working of gold or silver mines to their new Electro Metallurgical Machine for extracting fine and rusty gold from sands or tailings of stamp mills, or the sands of hydraulic gold diggings, or from the black sands on the coast of Oregon or California, and other parts of the world where gold is found.

The problem that has long troubled the worker of free-milling gold and silver ores is a method to save the mineral now lost in the tailings of stamp mills or flumes. This alone, if it could be saved, would amount to many million dollars profit each year, besides enabling the working of much territory which is now lying idle for want of an economical and thorough process of treatment.



Prof. James Manes and Sons, of Denver, Colorado, U.S., have invented a machine (represented in the above engraving) which it is claimed will save nearly the entire amount of mineral which passes through it, the loss not being over 10 per cent., and in many cases not in excess of half that amount. The machine is a cheap and practical process—it never need stop for charging or cleaning up, being nearly self-acting. Steam, electricity, and mercury are used in the process of extracting the mineral.

This machine or amalgamator is adapted for free-milling gold or silver ores or refractory after roasting. It consists of a series of three or more large grinders, wider at one end than the other, placed one above the other in a horizontal position, a shaft or spindle running through the centre of each.

The ore and mercury are fed into the first cylinder, passing into the second and then to the third. The first cylinder is furnished with steel mullers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, mixing the mercury and ore. The second cylinder is furnished with large steel brushes attached to the shaft or spindle, revolving at a high rate of speed through this a current of electricity is furnished by a Westinghouse dynamo electro machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which might have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, plated with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out from the cylinders. After leaving the drum it falls down on to incline copper plates the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the flume will be driven by the waste water; it sifts the fine sands from the coarse gravel and amalgamates it as above.

The specific points claimed by Prof. Manes and Sons in their patent are:

1.—The saving of almost all the mineral passing through the machine.

2.—The loss being less than 10 per cent.

3.—The entire absence of loss of the amalgamated material, thereby saving the mercury, which, with the processes now in use, there is a large loss both of mercury and the precious metal.

4.—The small cost per ton at which the ore can be treated.

By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained which in the ordinary flume and stamps passes off with the water; this often amounts to a large percentage.

The inventors state that if English stock companies will give their assistance to work the black sands of Oregon and California by paying for the building of the machines, they will take a share of the gold for their services, or they will send their machines to any part of the world, or will sell patent rights to those desiring any of their patent machines or revolving furnaces for roasting, smelting ores, ball pulverisers, &c.

Prof. James Manes and Sons are agents for the Morey and Spaulding Ball Pulveriser, that crushes and pulverises at the same time, and does as much work as eight stamps in a day, crushing either wet or dry.

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WORKS: PARKER STREET, ASHLEY LANE, MANCHESTER

Original Correspondence.

THE GOLDEN QUARTZ REEFS OF AUSTRALIA.

SIR,—Judging from your *Mining Journal* a very large amount of British capital must be invested in gold mines in various parts of the world, I might have said with sufficient accuracy all parts of the world—Europe, Asia, Africa, North and South America, and Australasia—I think, therefore, I may infer that a few descriptive notes on the modes of occurrence of gold and of quartz reefs, or auriferous lodes, in Australia will not be void of interest to a considerable number of your readers. I hope also that as my notes will be the results of my own observations on our gold fields during the past 23 years, and not vague generalisations, they will prove to be of practical service to those engaged in gold mining in other parts of the world. I purpose giving the actual outcome of exploration in quartz reefs on our gold fields, combined with general geological descriptions of the several fields I mention.

Some 25 years ago quartz mining was in Australia in its infancy, but few shafts having been sunk below 100 ft. in depth on any reef; while at the present time a large and increasing number have attained from 1000 to 2400 ft. With these few introductory remarks I start my subject, but must mention the probability of interruptions to the regularity of my descriptions, as I may be called to visit distant gold fields, and thus prevented from carrying out my intentions.

In Victoria probably exist some of the most important quartz reefing gold fields in the world. These reefs are naturally divided into seven groups of which two are important and five are of lesser importance. The two main groups or belts are well defined, have a general direction north and south, and are in lower silurian strata. The eastern group of the main belts embraces (commencing from the northern extremity and going south) the under mentioned gold fields:—Kamarooka, Raywood, Sandhurst (or Bendigo), Marong, Castlemaine, Fryers Creek, Maldon, Newstead, Yandoit, Taradale, Daylesford, Gordon, Blackwood, Ballan, and Steiglitz. There are in it nearly 800 distinct quartz reefs actually proved to be auriferous, and this belt, so far as at present explored, is just 100 miles in length. At the end of the year 1883 there were 6556 quartz miners engaged in this belt, which for the sake of convenient reference I shall in future call the Bendigo belt, after its principal gold field.

The western main group or belt, which for a like reason I will christen the Ballarat belt, comprises—Wedderburn, at the northern end, Kingolver, Inglewood, Tarnagulla, Dunolly, Maryborough, Talbot, Clunes, Creswick, Ballarat, Buninyong, Smythesdale, and Bulldog at the southern end. In this belt there are 543 distinct quartz reefs actually proved to be auriferous, and so far as now explored it is also 100 miles in length. The quartz miners engaged in the Ballarat belt at the close of the last year numbered 3644. These two great belts, the Bendigo and Ballarat, are separated on the map of the colony of Victoria by the 144° of longitude, and physically by a barren and depressed strip of strata some 15 or more miles in width. A large portion of this strip is covered by newer volcanic rock, but in the numerous outcrops of the lower silurian strata there are no auriferous veins found. Of the five belts of lesser importance three lie in lower silurian strata and two in the upper silurian.

In Victoria the quartz reefs run at right angles to the main dividing range, but parallel with the principal spurs or tributary ranges of the main divide, and by a study of the map it will be observed that the general direction of these ranges or spurs on the gold fields is northerly or north-westerly at about right angles to the main dividing range. It may also be remarked that several of the belts are more or less separated by low depressed country in which are the valleys of rivers, another physical proof that the high lands tend in a northerly and southerly direction. The foregoing brief outline of the grouping of quartz reefs must suffice, without my going into what I think unnecessary details, about the belts of reefs of lesser importance in Victoria. Let me, however, mention that the total number of men employed in quartz mining at the end of 1883 was 14,078, and that there were 3779 distinct quartz reefs actually proved to be auriferous. Many of these quartz reefs outside of the two great belts are short in length on their strike, and frequently consist of only one or two shoots of quartz.

Bendigo gold field, now better known as the Sandhurst gold field, after the large city of Sandhurst, which is situated in the midst of the principal gold mines, and is the capital of the county of Bendigo. At the close of the year 1851, and soon after the opening of the Mr. Alexander gold field (now Castlemaine), the diggers in search of new fields passed over the Big Hill granite range, a spur from Mr. Alexander, and dropped down into the basin of the Bendigo Creek prospecting for gold. This they quickly found, and an extensive rush set into the new alluvial diggings. The sinking was comparatively shallow, say, 20 to 30 ft. right up to the surface during the first few years after the field was discovered. Gold was plentiful and panniking were put to a novel use, many miners being able to half or nearly fill them with gold before breakfast.

To the pioneer prospectors who first made their way through the forests to the summit of the Big Hill range, the Bendigo gold field then simply presented to view a wide spreading forest covering undulating country. Probably their attention might have been attracted to the hill now known as New Chum, through its being a little more prominent than its neighbours; but there could have been little else in the landscape that would catch the eye, and nothing to mark it as one of, if not, the greatest quartz gold fields in the universe. For a couple of years little or no mining but alluvial was carried on. Many thousands of diggers spread over the numerous shallow gulleys reaping rich rewards for very little labour. For miles round Bendigo had the appearance of an immense camp, white tents occupying all the available vantage spots amidst the forest, consisting for the most part of the lovely ironbark, with its dark or nearly black bark and compact rich foliage. I need not depict the rapid change the miners made in the face of Nature in this region; of the felling of the handsome forest trees for firewood, &c., only those trees being left that gave shade or were likely to cause damage in their fall if cut. No; what I want to tell about is something quite different. The diggers delved eagerly in the gulleys for gold at the feet of hills that were immense white crowns of fantastic forms. Some were pinnacle shaped, others more dome like, others wore crests formed like those on old helmets, others somewhat resembled ruined walls, whilst other hills were merely capped with loose white fragments, attracting little or no attention.

After the flood time of the rush was over, and the restless nomadic diggers had begun to settle down on finding a goodly supply of auriferous washdirt, the Sabbaths, or days of rest, were more observed, and also partly utilised by the same diggers in paying visits, accompanied with hammers, to these white crowned hill tops, where they yarned, smoked, and broke off piece after piece of these crowns. Possibly the reader may have guessed what these white crowns consisted of. Outcrops of reefs. They were formed of quartz, bleached white by exposure, and contained gold. This explains why the diggers remembered to take their hammers, for with them they managed to get many a handsome specimen. And as specimens or curios only they were treated for some time. This can be readily understood, because it was far more easy to wash out free gold from soft clay and gravel wash than to break it out of hard quartz with hammers and picks. After this manner did these monuments of the denudation of the hills gradually disappear before the Anglo-Saxon; from Monument Hill, appropriate name in more ways than that on it, a huge pinnacle of quartz shot up towards the sky, New Chum Hill, Specimen Hill, Tyson's Hill, Austlers, Windmill, and many others. Perhaps I need hardly explain that these said white crowns were the outcrops of reefs, portions of which existed below the surface, as are now known to a couple of thousands of feet, and quite likely to very many more thousands still further down. Not only, however, did they indicate their continuations downwards, but also what had existed upwards probably for thousands of feet also. And the denudation or destruction by Nature's operations of those vast upper structures by natural sluicing operations was due the concentration of gold in the alluvial deposits so easily obtained by the miners. These great outcrops were parts of those reefs still existing below, from which the bounding sandstones and slates had been denuded, because these strata were not so hard and could not, therefore, offer so great a resistance to the destroying elements as did the hard quartz of the reefs.

Stripped of their bounding rock, and deprived of their support, these outcropping white quartz reefs bleached in the sun and atmosphere, and got weathered into somewhat fantastic forms, rarely affording an idea of their original shapes. One of these outcrops escaped the attention of these, permit me to call them, vandal diggers until the year 1860. The only reason why it was so was, I presume, because it was too wretchedly poor to waste even leisure time over. It was, however of no mean dimensions, although to a considerable extent over shadowed by the New Chum Hill. For this last member of its tribe I felt a particular regard, and paid it many a visit, sometimes climbing to its summit to muse over the past geological history of the Bendigo basin, a magnificent panoramic view of which, especially to the south, was spread out at my feet. At this time I doubt if there was any other person on Bendigo that cared one jot for this solitary memento of the past, which had been carved out by Nature's resistless elements. For myself I felt a great regard for it, and I shall not readily forget my feelings when passing early one morning I observed a man perched on it boring a hole preparatory to blasting it down. I enquired why this was being done of a man at its foot, and he informed me they were employed by a road contractor who was in want of road metal. It was no use my protesting, I would only get laughed at even by the then authorities, and the work of destruction had already begun of what I looked upon as a piece of valuable public property. I consequently betook myself to an adjacent hill (west), sat down and determined, at any rate, to preserve a careful sketch record of the last old Bendigo quartz crown. (August 25, 1862). It was from 18 to 20 ft. in height, 4 ft. 6 in. in width, 36 ft. in length, and underlied to the east about 1 ft. in 6 ft. And so my old friend got "put on the roads" (a not very complimentary position in those days when prison labour was mostly so employed).

As these outcrops of reefs and the peculiar forms of the hills on this field are directly connected, I will explain their relation one to the other. Viewed from the north or south the hills are rounded and almost always gently sloping, whilst from the east or west they are serrated or saw formed, but not in a marked degree, because the hills are not sufficiently prominent to exhibit clearly their profiles. Each hill has a length, the strike of which is like to that of the reefs, about 20° west of north. The slopes from the summits to the north are very gentle, whilst those to the south are in comparison precipitous. Now, the dips of the reefs are north where the hills are of this shape, and in consequence the northern slopes of the hills are capped with the quartz outcrops of reefs, which being harder than the strata offer greater resistance to the destroying elements, and thus give form and contour to the hills. From the tops of the hills to the south the "caps" of the reefs are broken through, and the softer strata beneath are left exposed to disintegration and destruction, and it is due to these circumstances that they now present the boldest declivities. To more clearly explain the foregoing I must here mention that the reefs referred to are arches formed in anticlinals of the corrugated strata, and supposing the strata beneath these quartz arches, or reefs, to have been excavated we should then have immense archways or tunnels, having a decline to the north with the dip of the reefs into the orust of the earth. This dip in the reefs is, as a rule, very gentle, but the angles vary with the inclinations of the corrugations of the strata between which the reefs lie.

Ironstone Outcrops.—On those hills where little or no quartz outcropped there was, however, another indication of their presence beneath—outcrops of what the miners very appropriately termed ironstone. These sometimes protruded above the surface as much as 5 and 6 ft., and could be traced continuously very often for a long distance. Such indications of lodes in other countries are not uncommon, as miners are well aware. Those I am referring to were formed after this manner, casing and tracks of reefs where quartz shoots die or wedge out and the cheeks or walls of the reef come together, they combined formed what we term the "tracks" of reefs, which can be followed to pick up new shoots of quartz. Above the water level the pyrites in reefs decomposes, and the surface water percolating through the quartz absorbs the iron of the pyrites and deposits some of it in the strata forming the walls, or, as our miners term them the casings of the reefs, and transports the balance down into the tracks, which get saturated from time to time with these ferruginous water, just as the supplies of water are sustained or not from the surface. Below the water level the casings and tracks have quite a different character; there the casings usually consist of black carbonaceous decomposing soft slates, and the tracks are much the same with more or less thin quartz veins and pyrites. The casings above the water levels are really formed of clayey ironstone, in which may be found crystals of carbonate of iron. Having described the contour of the surface, and the indications of reefs thereon, I must give a brief description of the geological structure of the gold fields.

Geology.—As I have previously remarked a granite range separates the Mount Alexander or Castlemaine gold field from the Bendigo or Sandhurst field. The former lies to the south of the latter. The principal lines of reefs on Bendigo are about half-a-dozen miles from the granite, and to the north of it. No other outcrop of granite exists anywhere else near to the field. The whole of the gold field lies in lower silurian strata, and this formation runs from the granite just spoken of away north for some 30 miles, where it dips beneath the Murray River tertiaries to the east some 25 miles, where it appears to dip beneath a trap range, on the other side of which lies an extensive area of upper silurian; and to the west about 100 miles, the nearest gold fields in that direction being about 25 miles distant in the Ballarat auriferous belt. The whole of the strata within this field is corrugated, and more or less decomposed. The corrugations are closer together, and the strata more decomposed where the main reefs occur than otherwise, and especially nearer to the granite. The three main lines of reefs are distant from each other about ½ mile. The centre one is known as the Garden Gully and Johnson's line of reef, and has been worked on continuously for a distance of about seven miles. The eastern is the Hustler's line of reef, which has been wrought, but not without a slight break or two, for about four miles. The western line of reef is variously known on different parts as the New Chum, Victoria, Devonshire, Catherine, Star, &c., and has been worked continuously for about seven miles. Reefs are found in continuation of these still further south, whilst to the north for nine miles they have in several places proved to be of great richness. In addition to these, both to the west and to the east have rich quartz reefs been found. That on lesser important gold fields would be considered of very considerable value; and, in fact, in themselves would form a gold field equal to almost any other in Australia.

Saddle-formed Reefs.—In beginning the few remarks I propose making about the structure, &c., of the Bendigo Reefs, I shall confine my attention to the three main or master lodes or reefs, and commence with the Hustler's. The southern extension of this reef passes through the centre of the city of Sandhurst; many mines have been and are at work in the central park or recreation reserve, and others possess the rights to mine beneath the city itself. This reef was one of the first that was attempted to be worked, dating back to 1853, when opened by Messrs. Harris and Hustler, the reef being named after the latter, and their claim being only 12 ft. by 12 ft. They obtained rich gold from the surface, the first crushing yielding 26 ozs. of gold to the ton. This reef was saddle or arch-formed, and of comparatively to those found afterwards small size. The workings were in those early days visible from the surface, as the reef was followed down, and extracted in the arched formation. The open cutting from whence started the arched works was by my measurement only 40 ft. wide, and the reef itself about 20 ft. The roof of the arch where the "cap" of the saddle had been showed the inclination of the dip of the reef to the north to be about one in four. The number of shallow shafts sunk on the reef from its outcrop down to Ironbark Gully gave it more the appearance of shallow alluvial mining than of vein mining. And poor old Hustler, who worked hard at the windlass even after he had lost one arm by a blast, would be considerably astonished if he returned to this world, and saw the scale of operations carried on in mining his line of reef at the present time. Splendid winding-engines, and crushing and pumping, shafts, 1200 to 1500 ft., boring machines, and all the latest mining appliances in every department. This top saddle reef, like those found beneath it, occurred in an anticlinal of the strata, In cross-section it was crescent formed, with the points or horns of the crescent pointing downwards, tapering out between the beds of the strata at about 50 ft. from the apex or cap of the reef. These points or horns mentioned in the above description represent what are termed by the miners as the east and west "legs" of the saddle reef. Seeing the interbedded positions of the saddle-formed reefs on this field in the early days I could not but contemplate the possibility of their being of contemporaneous age with the strata, but I had to give up this idea after extended observation. The hanging-walls of these reefs generally consist of sandstone with casings or partition walls of slate separating the sandstone from the quartz, whilst the footwalls are commonly formed of slate. It is fortunate for mining purposes that the slate and sandstone beds are not transposed with regard to the reefs, as the sandstones form firm backs, and slate treacherous ones. In describing the saddle reefs as crescent-formed I should remark the caps or arches are not perfect segments of a circle, but incline more to the extended and inverted U (∩) form. This, I believe, however, depends on the extent of the corrugation.

The thickness of this upper reef in the centre of the cap was 12 ft. At 200 ft. below this top "saddle" reef, and almost vertically beneath it, was discovered another saddle-formed reef, which averaged fully 20 ft. in thickness in the cap, and about the same across the arch horizontally, showing this arched reef to be even more compressed in form than the outcropping ore. But the legs of the reef are longer, for the eastern started from the saddle with a width of 5 ft., and tapered in 200 ft. in depth to about 1 ft.; whilst the western, beginning with the same width, reduces to 1 ft. in 70 ft. in depth. I may here remark that either the eastern or the western leg, as the case may be, on all these saddle reefs is the longer and richer one.

Melbourne, May 20.

WM. NICHOLAS, F.G.S.,
Consulting Mining Engineer.

IRON INDUSTRY IN SPAIN.

SIR,—I should feel extremely obliged if you could find a little space in your valuable Journal for a few remarks upon mining operations in Spain, which I think will be interesting to many of your numerous readers in connection with the iron trade, particularly to the iron manufacturers, who are not generally acquainted with the immense resources of mineral wealth in this country, although much has been written on the subject by different mining prospectors; but although I have carefully examined all the various reports on mining operations in this country, I have not seen one written report upon practical metallurgy that gives the remotest idea respecting the manufacture of pig-iron from the crude ore in this country where the minerals are produced, which is really surprising when we consider that it is universally known in England that the deposits of rich magnetic and hematite iron ores are considered, according to scientific investigations, to be inexhaustible in many provinces in Spain. There are also in some districts in this province immense deposits of pure magnetic and other rich iron ores, but at the present time they are in abeyance, being too far distant from the place of embarkation; but according to recent information from the Spanish Government the development of those rich deposits are only retarded for the time being, as there are now certain indications that capital will soon be forthcoming to investigate those immense deposits of rich iron ores, as new roads are now being opened out, in order to facilitate the transport of the minerals to the place of embarkation, but there will be also at no distant date another most important facility for transporting the minerals to the place of embarkation—a concession has been granted by the Spanish Government to construct a railway that will pass the vicinity of those rich deposits of iron ores, which will then enable the prospector or iron manufacturer to transport the minerals to the place of embarkation at a nominal cost per ton.

But apart from the foregoing there is in this province, and near to the important commercial town of Malaga, immense deposits of rich magnetic and hematite iron ore, situated about 40 metres from the place of embarkation, only requiring capital to develope those most important rich iron ores to great advantage for the mining prospector or iron manufacturer. Now it is most extraordinary that we do not find one English firm or iron manufacturer, who are constantly utilising the rich magnetic iron ores, that they have not considered the great advantage to be derived financially by utilising the rich iron ores where the minerals are produced by erecting furnaces for smelting the ores contiguous to the mines, which would enable the manufacturer to export the pure pig-iron direct to England, freed from dross and other impurities. This is a most important subject, worthy of serious consideration by the great iron manufacturers in England, particularly the most extensive iron and steel manufacturers, that utilise the rich magnetic iron ores that are produced in Spain, as it is generally known by exporting the crude ores there will be a considerable loss in weight. Besides there is another serious drawback in exporting the crude ores—vessels taking in cargoes of mineral. There will always remain a certain amount of residues with the mineral which is not preventable, and in many instances, when the minerals are required to be forwarded inland, there will be a considerable falling off in the weight. Therefore, taking into consideration the many unavoidable reductions in the transit of the minerals the purchaser of the minerals or the iron manufacturer will eventually discover at the closing of the financial year, they will be agreeably surprised to find that the margin of profits would be materially increased by exporting the pure pig-iron; and by realising such important statements it may be observed, without exaggeration, there is in this district unparalleled facilities for smelting purposes—rich magnetic and hematite iron ores, and an inexhaustible supply of limestone—that will be required for the fusion of the minerals.

The before-named mines when properly developed have many advantages over others of the same class of minerals; they can be explored and worked at much less cost, labour being cheap, and an abundant supply at all seasons of the year, and only about 40 metres from the place of embarkation and 6 miles only distant from the shipping Port of Malaga. But in the event of these splendid magnetic and hematite iron mines, not surpassed by any others of the same class of minerals in the whole kingdom of Spain, being taken in hand by a syndicate of gentlemen or iron manufacturers they would secure a most valuable mining property unattainable in any other mining district in Spain. There is also another important advantage to be taken into consideration—the locality indicated, where the mines are situated, are contiguous to the place of embarkation of the minerals or pig-iron as the case may be; also a permit is already obtained direct from the Spanish Government to embark or disembark any materials required for mining operations or loading minerals, &c., obviating the necessity of ships entering the Port of Malaga, thereby reducing the expenses materially upon the whole operation.

Should this important adventure be taken up with spirit and the adventurers decide to erect smelting-furnaces contiguous to the mines, vessels taking in cargoes of pig-iron to any shipping port in England could generally depend upon return cargoes of coal and coke for smelting purposes, thereby securing two freights, which would have a tendency of reducing the freights of inward and homeward bound vessels; and in order to show the important advantages to be derived at this time by securing valuable mining properties, particularly in this part of Spain, as the before-named, to succeed others now nearly exhausted, which will be seen by the following important notice, which I translate from a Spanish (Biscayan dialect) newspaper, the Irurac-Bat of Bilbao:—

"The immense exportation of iron ore from Biscay threatens in a most serious manner the future welfare of this important commercial town and district, which within the last few years has become one of the first of those of the greatest mineral shipping stations in Europe. Persons who are practically well informed as competent judges of that mineral district are of a decided opinion that the iron ore will be exhausted in those mountains in a very limited time, from which more than 4,000 000 tons have been periodically exported. In corroboration of these facts the said effects of such prognostics are already perceived in some groups of mines of the most important. Mines which were considered inexhaustible have already disappeared, and others of great renown begin to lessen considerable in

their production. Mining engineers, who are constantly visiting and surveying the mining districts and the different localities where the principal mines are situated. are of opinion that in the maximum term of five years the iron ore contained in the mountains of Somorrostro will be exhausted."

Should such gloomy calculations be confirmed in a very short time the result will be that the iron industries being the basis or the future prosperity of Biscay, the iron manufacturers will have no other remedy than to import iron ore from other districts at much extra cost, after having possessed in this province the most productive iron mines in Spain, and sold their production at excessively low prices.—*Malaga, July* 10. J. B. HOWARD.

THE LITERATURE OF MINING—No. I.

SIR,—The literature of mining embraces science in an eminent degree and diversified application, whilst its practical results are more multiform and complicated than even agriculture, but is still fragmentary and disjointed, and in consecutive form unwritten, at least uncompiled. Its archives are museums and journals devoted to its proceedings and practical results—the former to results specially, the latter to both concurrently, with no recognised authoritative standard determinative of issues, as to what they ought or might have been. It has a nomenclature partly its own and partly derived from its allied sciences. Mining is itself a composite science, or perhaps, more properly speaking, a skillful industrial pursuit—aided, directed, and controlled by the several of the exact sciences—one of which it can never become, from the impossibility of framing anything but general superficial rules for its practical conduct and direction. The literature of mining, then, must consist of theoretic formulas, founded on several cognate sciences—its experimental practical experiences, and the results. If such be the case in respect to the profundities of its physical phenomena the truistic dogma—"Where it is, there it is"—can be no more than an exocitic—a captious figure of speech, a cloak of ignorance, opposed to natural science, and the rules deducible therefrom by observation and practical experience, and, whenever resorted to, subterfuge would be its most explicit definition. The literature of mining must perforce consist largely of its recorded experience, and not of abstract theories deduced from mere observation as the failure of scholastic teaching, from its varied imposing curriculum is confessedly inadequate to constitute its literature, or to frame rules adapted to circumvent the physical constitution, or rather, to correctly interpret, the physical phenomena of the mineral realm of Nature. What, then, remains but that practical experience, enlightened by philosophical research and the auxiliary scientific aids, must constitute the true sources of its literature, and qualify the intelligence necessary to the proper conduct and direction of mining. Its literature is the expression of itself—its science and art, the modes of their application, and what results thereby and therefrom. In respect of its hidden wealth and its attendant phenomena, what does its literature testify or teach as to the proper courses to be adopted? Is it not—beyond the immediate pale of its ordinary outline, such as shaft-sinking, level driving, &c.—one of physical incidents variously described relative to the constitution of rocks, their structure, the direction of their planes and cleavage, if of sedimentary origin, relative to metalliferous lodes. The situation of the igneous rocks and dykes, of cross-courses, slides, and faults, by which the ore-producing veins are affected beneficially or adversely as the case may be, their displacement, and in what direction relatively to the disturbing agencies and the containing rocks. Still the truism, "Where it is, there it is," survives impertinently pertinent—the former as applied to intelligently-directed exploratory operations; the latter as resorted to as the subterfuge of ignorance and stimulus of arrogance. The presumption is there is nothing to guide; it is all haphazard, it is a matter of chance—one direction is as good as another, and as likely to be successful. The literature of mining embraces the erroneous as well as the correct methods and principles. Its records exhibit its salient features, its changeless and changeful forms and figures, and evidence its distinction from all other enterprises and pursuits, whilst at the same time in its complicated lineaments and multiform detail it has something in common with each and all. But what does its study suggest and imply contemplated from the point of view commanding an outline of its physical peculiarities retrospectively and in advance, for it is with Nature as well as science and skill that it has to do, and from Nature that its highest literature is derived. What Nature uniformly presents is suggestive of system, whilst uniform or approximately uniform presentations of natural phenomena in the rock-bound regions of this terra-aqueous system is the privilege of those to witness who are intimately associated with its ascertained peculiarities, or have frequent opportunities, availed of, to critically investigate the same. ROBT. KNAPP.

Ione, Nye County, Nevada, June 16.

CHONTALES, AND ITS MANAGEMENT.

SIR,—Will you allow me through the *Mining Journal* to make a few remarks on the past and present management, with its results, on the Chontales Mining Company? In 1881 the shareholders received a report from Mr. H. Bell-Davies, for which the directors paid for the information supplied, with costs of visiting the property, 1000*l*. He remarks—"Thus the average yield obtained from each ton of quartz treated is rather more than 4½ dwts. If it be borne in mind that this percentage is taken from the gold actually extracted in the mill, and not calculated from the assay value of samples, it results that a profit should have been made from the commencement of the undertaking." That up to the present time the shareholders should not have received dividends which the property justifies ought to have been continuous, arises either from bad management on the part of the executive at home, or at the mines, or from both.

The mines, I believe, after my experience of 11 years, are in a better condition for giving satisfactory results than at any period that I have been a shareholder. At present we are working a very rich portion of the Consuelo Mine, and just upon, if we have not already entered, a rich portion of our property, known as the San Antonio, from which formerly over 2000 tons were taken, averaging over 8 dwts. to the ton, and within a short distance of the stamps, and in a recent letter Mr. White states that 4½ dwts. would pay a dividend. A meeting of the company will soon be held. I enclose some returns which any shareholder after having read, and endorsing the views I take, who cannot be present at the meeting, I shall be glad if they would express their opinion through the *Mining Journal*, that it may be seen there are other shareholders who take the same views as myself. I regret very much the attendance of so few shareholders at the meeting, many living within a comparative short distance of the company's office. I enclose the copy of returns from the mines for the months of April and May, 1883, also May and June, 1884:—

	Tons.	ozs. dwts.	Cost.	Value.	Profit.	ozs.
April, 1883...	430	... 1 16	... £302 8 0	... £1780	... £1477 12 0	... 612
May, ,, ...	370	... 1 8	... 269 0 0	... 1490	... 1211 0 0	... 520
May, 1884 ...	300	... 1 6	... 660 7 4	... 1130	... 469 12 8	... 390
June, 1884 ..	240	... 1 2	... 856 0 0	... 980	... 124 0 0	... 335

As regards the last two months the cost would be increased taking out the ore, in consequence of being underneath the level, and having water to contend with there would also be an additional item as regards money spent on San Antonio—103*l*., but taking these circumstances into consideration the difference between the returns of 1883 and 1884 will necessitate that a full explanation should be given at the meeting in the last two months' reports. Mr. White states that nine stamps worked 29 days, and crushed 300 tons of ore. We are well aware that 24 stamps are equivalent to 2000 tons a month, and that nine stamps are equal to 750 tons for the month. In the previous month 300 tons were crushed; only two weeks the stamps ran, in consequence of the Easter holidays: 70 tons of ore, considered to be worth 26 dwts. to the ton, was delivered at the stamps ready for crushing, so that 230 tons is all that we are aware of having been mined during the last month. I would refer you to Mr. White's entering upon his duties as manager of the mines being told he would not know where to find ore producing an ounce of gold.

	Tons.	Dwts.	Cost.	Value.	Profit.	Ozs.
August, 1877.....	850	..... 4½	..... £336	..... £524	..... £187	 190

Crushing 850 tons, as against 300, cost 336*l*., and with 4½ dwts. as against 22, making a profit of 187*l*., the difference in working is very apparent, and it is a question that suggests itself to my mind if the time has not arrived for a change of manager. At a recent visit to London I read the letter from the manager. The contents were unlike any of his former letters, and made a third visit to the office before I left London. The secretary accounted for the way in which the letter was written from his having lately suffered from an illness. Mr. White expressed his wish to come to England for a change, which is no matter of suprise, having been in Nicaragua since 1877. He was anxious about his nephew being raised to 200*l*. per annum. As to the duties of the nephew, I found that it consisted in keeping the cash account, and occasionally to be sent with a message on business connected with the mine. Our not having received a dividend up to the present time, it becomes the executive to be as economical as possible. There are many boys who have been educated in the Bristol Mining School and other mining schools whose parents, and the boys themselves, would be glad enough to enter upon an engagement under 1*l*. a week, and equal to the duties involved. If any preference were shown, as a matter of course the manager would be entitled to a due consideration. On looking over the correspondence of the manager at the office I found that Mr. White had disposed of the pneumatic stamps without the knowledge or consent of the directors. I was much surprised, and found upon enquiry that the directors were taken by surprise. Mr. Bell-Davies in his report, referring to the pneumatic stamps, stated that they were in good order, and in the future would be able to do good service. I have written to the directors to furnish me with the amount for which the stamps were sold, and to whom sold. The manager assigns his reasons for selling not having any funds. That such should be the case, and the directors to have spent nearly 20,000*l*.—the capital raised on formation of the new company—without having made the slightest return, shows a want of judgment on the part of the directors. The length of time that transpired before active measures were taken for working the property, the payment of 1000*l*. to Mr. Davies, the loss of time in home expenses and at the mines before Mr. Davies could make it convenient to visit the property, that the 20,000*l*. new capital raised was exhausted, whilst, at the same time, Mr. White, who had been at the property master of the position, had all the past plans of the operations at command, and the men under him who had worked at the mines where the present operations are being carried, ought if he did not make representations as to mining the property. If he did so, and the directors did not act upon his suggestions, then the blame is attributable to the directors. We have now a good prospect before us, and the shareholders would do well by looking after their interests.

Bristol, July 16. WILLIAM BALL PALMER.

KAPANGA GOLD MINING COMPANY OF NEW ZEALAND.

SIR,—I desire through the *Mining Journal* to call attention of my brother shareholders to what appears to me to be a most startling statement, made by the new captain of the mine in his report. Messrs. Rickard Brothers say Capt. Argall is able confidently to state that in six months he will lay open sections of ground on the two lodes equal in area to the whole of the ground stoped in the mine during the existence of the company, and this for the moderate sum of 4500*l*. This is either a most rash statement to make in face of the history of this company, or there is matter here for a more searching enquiry into the past, and the manner our money has been spent. I am not one of those persons who care to "cry over spilt milk;" but as a shareholder of many years, and having paid at one time 5¾ for shares in the market, I think it may be profitable, if not to myself personally to others, to go a little more into this matter.

I have attended many meetings of this company, and the way in which Capt. Thomas's name was upheld by the executive has always struck me as most remarkable, especially when considered now by the light of experience, and I cannot help thinking that some moving spirit has been at work amid the executive, which it will be well now for the shareholders to have removed: 50,000*l*. to 70,000*l*. I believe has been spent on development, and we are now told that some 7000*l*. would have sufficed to do the work. Surely there is something here which demands a searching enquiry. I will say no more now; but I shall be much surprised if the secretary and directors are to be allowed to remain "as you were" in face of such a statement as I have called attention to. A. C.

Palmerston Buildings, July 16.

HEALTH ON THE GOLD COAST.

SIR,—With reference to a letter in the *Mining Journal* of March 29, from Dr. Bourke, headed "Health on the Gold Coast," I venture a few remarks. It is extremely probable that those who take an interest in the plausible remarks of this gentleman, and have never ventured upon the West Coast of Africa, might in a sense and to a certain extent be misled. I admit the exaggeration upon the insalubrity of the climate is extensive, but not so great as Dr. Bourke would convey. The West Coast of Africa is most undoubtedly exceedingly unhealthy, and in such places as Suly-Mah, Bathurst, and up the River Gambier fatal to Europeans. Only two days since at La Compagnie de la Mine d'Or Ebbooyaow Hill, d'Abosso, a European succumbed to the effects of malarial fever after two days' illness. This makes the second death in this neighbourhood since January, and one invalided in February—the total Europeans being 13.

In the face of this, I fail to imagine how Dr. Bourke can produce such a favourable report as he does, unless he favours the old saying, "Don't halloo before you're out of the wood;" and, as he writes from London, I take it he is well out of it. Dr. Bourke undoubtedly does not forget that during his sojourn to the West Coast he deemed it necessary to take his quinine twice and three times daily. Perhaps as West Africa is such a salubrious climate, in his estimation, he will tell us why?

During my voyage from England I had much beneficial advice from one of the oldest Colonial officers on the Gold Coast, Captain Barrow, C.M.G., with reference to climate, and he informed me that the utmost caution must be exercised, and although he has been many years on the Coast, and is an acknowledged exception, he considers it still necessary to employ every precaution against the climate. There are several errors in Dr. Bourke's letter, and he is specially erroneous when he remarks that Tacquah has an elevation of 800 to 900 ft., the elevation being 390 ft., or thereabouts; but this is only a minor error. If it were not that I encroached too much upon your valuable space I could tell of cases of fever lasting on and off for three months. It is to be regretted that Dr. Bourke has given such a favourable account of such an unfavourable and unhealthy climate—not perhaps with a view to deception, but certainly flavouring with a view to interest. CHARLES STUART DOBSON, M.E.

Western Wassau, May 14.

MINING ON THE GOLD COAST.

SIR,—Having at the request of Mr. E. Lane, manager of the Akankoo Company, made a careful examination of the reduction machinery at Akankoo, I find that most satisfactory progress has been made in erecting it. One battery is quite finished, and the necessary appertaining appliances, elevators, stamper box, supply tank pumps, stone crushers, &c., are now complete. The pump which supplies the stamper box tank gives the highest satisfaction, raising some thousands of gallons of water per hour, of which there is an unlimited supply at all seasons from the River Ancobra, which is situate some 50 fathoms from the stamper house. I can conscientiously say the machinery in question is one of the best and most substantial reduction mills in West Africa.

People in England must not imagine that machinery, of any description, can be erected here with the same dispatch and economy as at home; the transport here alone entails a deal of time, trouble, and expense; and although it is not exactly the heavy work that occupies the greater portion of a manager's time, but the detail work, so to speak, and until the detail work is finished it is utterly impossible to proceed. Quibblers may enquire what I mean by this detail work? Well, anticipating leaks in mercury and stamper boxes and preventing the same, putting down blanket tables, fixing blanket tanks, and a hundred other small tasks that not only require the assistance of skilled labour, but the immediate supervision of the responsible man. The first battery will most undoubtedly be at work on June 18, and the second by the end of the month.

The completion of the latter has been somewhat delayed owing to the illness of Mr. Andy, the engineer, who having been attacked by fever has consequently been unable to attend his duties. The two batteries of 10 heads each are, I take it, capable of reducing quite 25 tons daily (Akankoo quartz), the diameter of the stamper rods being greater than any other gravitation stamper rods out here. The result is, they are naturally heavier, and capable of doing a greater amount of work, and should the night work be carried out as contemplated by Mr. Lane, which will ensure double the returns, I have no reason whatever to doubt but that the Akankoo (Gold Coast Mining Company will be one of the finest speculations of the day.

With reference to the night work, which the men object to on account of the malarial effects of the climate, I think there is little to fear if a man is abstemious. It is carried on in other companies—the Wassau Company, for instance—and as yet no ill effects have arisen. CHARLES S. M. DOBSON.

Axim, West Coast of Africa, June 16.

AMALGAMATION OF GOLD WITH QUICKSILVER.

SIR,—It is hardly to be expected by the bulk of your readers that the letters of an obscure individual like myself will have been missed from your pages, but there may be some who are interested in a subject that I have so much at heart—the saving of gold by amalgamation with pure quicksilver—who will have wondered how it happened that just as my Quicksilver-Wave Amalgamator came before the public that I disappeared as a contributor to your columns. The reason is expressed in one word—illness, that came upon me just after the machine was got to work at Messrs. Johnson and Sons, and which has prevented me taking any active part in the working and trials of the machine. However painful and disappointing this may have been to me it has not been without positive benefit to the machine, proving, as it does, the ease with which it has been worked and the success that has attended such working when superintended by those who had never seen it till within a few days of its leaving "only a trace" in some mineral from the Transvaal, and only a fraction over 1 per cent. in the tailings of ore from the Oscar Mine. These results I take from the Quicksilver-Wave Amalgamator Company's advertisement in last week's Journal.

Whatever objection may be made to the words I supplied to your columns last autumn—that "I believed it possible to get the last particle of gold out of stone by the use of pure quicksilver only"—a properly constructed amalgamator, I feel sure that anyone interested in this subject will admit that, if not in a strictly technical, I have at least in a commercial sense fulfilled my words, especially as the expense of the process does not exceed one shilling a ton, and when the amalgamator is placed in front of a battery of stamps, or other crushing machine that will give a constant and regular supply, no attention is needed except occasionally a little oil.

I should not have written just now, but I cannot allow the too flattering remarks of Mr. Nicholas, of Melbourne, in his letter in the Journal of last Saturday, to pass without acknowledgment. He fully confirms the great loss that takes place in California in the extraction of gold from its matrix by his experience in Victoria. I cannot from his figures compute the percentage of loss; but as it varies from 2 dwts. to over 1 oz. per ton, and as the average yield of gold in Victoria does not exceed 11 dwts. per ton, I cannot think that the loss in that colony can be less than the acknowledged loss of 50 per cent. in California since the first discovery there.

The subject is one of immense importance to every one, even to the world at large; and I certainly feel gratified to have been the means of reducing the loss from 50 to 10 per cent., as proved by ten months' work at Conrad Hill, North Carolina. And now these trials in London have proved that this loss is reducable when the machine is in the hands of strangers, to less than 1¼ per cent. Mr. Nicholas says:—"More fine gold, no doubt, could be saved than is done in many batteries by more careful attention; but the main question considered at present is, what will it pay to save, or whether it will not pay best to put through a larger quantity with certain loss of gold than a less quantity with a less loss."

Now, I think the only answer to that question is, that by my machine large quantities can be treated at a cost not exceeding 1*s*. per ton, and by the smallest machine, which is equal to 10 tons in 24 hours, the expense does not exceed that sum. In fact, where much power is used to drive the stamps or other crushing machine the small power needed cannot be recognised as an expense. The whole of the crushed ore goes through the quicksilver twice, or, to describe it more correctly, it goes through two separate lots of quicksilver, and thus is treated twice. HENRY MOON, M.I.

Seaford, Sussex, July 14.

AMALGAMATION OF GOLD.

SIR,—In a scientific (?) journal for the present month is an article on the Extraction of Gold, which will do duty either as a scientific puff or as an example of scientific ignorance in the use and limitation of certain mechanical appliances Without discussing the question of the loss of gold incurred in milling operations, which will always more or less prevail, it will be valuable to the writer to be told—1. That the dry process for extracting gold is not new, and that the whole of the dry processes in America have thus far proved more mitigated failures.—2. That all pulverisers not only require an inordinate amount of power to do a limited amount of work, but soon so quickly from wear and tear as to practically exclude themselves from service in the reduction of quartz.—3. That wind or pneumatic concentration has never yet been successfully established either by the Belgium, German, or American engineers, including among the latter Krom himself.—4. That the late Mr. Henry Locke was no practical authority on gold mining, although he compiled a large work on the subject. For many reasons it could be wished that Messrs. Jordan and Longden's patents in their application would make "an epoch in metallurgy," and give fortune to themselves and to others. On the other hand, it is equally desirable to exclude pretension more or less imaginative, involving disappointment, entanglement of the truth, and loss of money. B. McK.

ADVERTISEMENTS OF MINING SHARES AT FIXED PRICES.

SIR,—If the discussion of the above subject in your Journal should prove, as I hope it may, of advantage to the outside investing public I for one shall be glad, but then it must be carried on, not by brokers only, whose interests may not be identical with their clients (as they ought to be, of course), but by their clients also. As one such client let me say the thing we outsiders want is a reliable list of business done with prices attached to enable us to form some idea as to the value of any mining shares we may wish to dispose of or to purchase. Of course, I know, seeing that mines are subject to so great and many changes, that in some few cases such prices might be no real guide, but for all that in the majority of cases I think it would be best. Now have we such a reliable list? We have brokers advetisements and their circulars also, but, judging from what "Tea" says of them they are not reliable. Then, again, we have your list in the centre page of your Joournal. This I have no doubt is correct, and if, as your correspondent suggests, the number of quotations were to be considerably extended we should be gainers thereby, and, my suggestion, if you would make the Share List on the your last page as complete as you can, we should then have all the information possible, and have only ourselves to blame if we were imposed upon by circulars or otherwise.—*July* 15. A. N.

OLD SHEPHERDS DIVIDENDS.

SIR,—Some months since a circular was sent to the shareholders of Old Shepherds Mine informing them of the sale of a portion of the same, and that the proceeds would be paid them as a dividend. I for one should like to receive something in return for the money I have paid, and owing to the continued depression in the lead market it does not appear we shall get anything by working the mine at present. As a gentle reminder perhaps by inserting this in next week's *Mining Journal* it may catch the eye of some of the directors.

July 10. PATIENT.

THE CAMBORNE MINING DISTRICT.

SIR,—The subject which has engrossed the attention of mining men in this and the Camborne district for the last ten days has been the proposed buying up of the shares in Camborne Vean by Wheal Camborne (Limited). The facts and circumstances, as narrated to us, are these:—Wheal Camborne has opened up the Old Gon's shaft, and found the cross-cut to the Camborne lode to be about 150 fathoms, and in it two fine and productive lodes have been intersected. The Camborne lode has also been intersected, and found to have been driven on for 157 fms., of which 50 fms., worth at the least 24*l.* to 30*l.* per fathom, can be stoped or taken away for 50*l.* a fathom, leaving a very large margin of profit. Over the 50 fm. level more than 40,000*l.* worth of very rich ore has been taken away and sold in former workings. The Gon's lode also is from 5 to 11 ft. wide—a very good lode for copper and tin: and on this lode, in the adjoining sett of Dolcoath, is the great discovery recently made, and which must be in the Wheal Camborne sett—certainly 90 fms. in length. After passing through the Camborne sett it will enter Camborne Vean.

These discoveries have naturally caused enquiry for Wheal Camborne shares; but these are principally held by Devon and Cornishmen, who, know their value, and will not sell. To work the mine 6666*l.* 13s 4d. has been provided, and there are 39,993*l.* represented by 39,993 unissued shares of 1*l.* each; but the company purpose to issue of these only 5000 1*l.* shares, which are, to a great extent, applied for by the present holders—thus the capital thus limited would be 10,666*l.* 13s. 4d. This company appears to have taken warning from bye-gone events, and learnt experience at home and abroad, and have contracted for a skip-road to, I believe, the 170 fm. level. They have appointed no agents, the directors receive no fees, and one of their number, having experience, acts as purser and secretary. The Camborne Vean was a little "weak-kneed," there being calls in arrear, and its shares—6000 in number—had been selling at from 2½ (two pence half-penny) per share to 2s. 6d.; but for them practically there is no market. Under these circumstances, the following arrangement was being carried—the Wheal Camborne to take the Camborne Vean shares at 13s. per share, giving fully-paid shares in Wheal Camborne instead of cash, and agreeing to pay all vendors' calls in arrear. The two mines being intermixed could be worked far more economically as one undertaking. The Wheal Camborne men, by what may be considered an act of remarkable liberality, hoped to secure the unanimous consent of the Camborne Vean shareholders to the arrangement; but one of the largest holders at the last moment declined to agree to the proposed arrangement, and demanded cash and bills, which was at once refused. Thus serious damage is done to the whole district, for rich as Wheal Camborne is the carrying out of the plan of putting a 60-in. cylinder into the Camborne Vean house and forking the old mine, and sinking through the elvan, and continuing the sinking of the south shaft would have resuscitated the mining industry of this important locality, by establishing another most important mine. Unfortunately this, too, has been— LABOUR IN VAIN.

Redruth, July 17.

BIRMINGHAM AND HARROWBARROW MINING COMPANY.

SIR,—As a shareholder I have been looking out for a reply to the letter respecting the Birmingham and Harrowbarrow Mining Company which appeared in the *Mining Journal* of May 24. Although this letter contains explicit and circumstantial charges, neither the secretary nor any director has noticed it. Nor do they seem to care much for the shareholders, with whom, at least as far as my experience goes, they have ceased to hold any communication. The last meeting of which I have had any record was held on April 14, 1883. Of this only the most meagre and formal notice was sent, and no report of the meeting appeared in your columns or elsewhere A meeting seems to have been called last October, but not a line respecting this meeting has ever reached me. There were some damaging remarks respecting the company made in a meeting as reported by you, called by the liquidators of the Wheal Fortune Company, but this passed unnoticed by our secretary and directors. In the notice of the meeting called in April, 1883, three names are omitted and two new ones added—that is 15 months since; but this appointment the shareholders have never been asked to ratify. Your correspondent of May 24, although very reasonably dissatisfied, has evidently by some means received information about the company which has not been communicated to the body of shareholders.—*Barnstaple, July* 16. W. S.

SLATE QUARRYING.

SIR,—Referring to the report from your North Wales Correspondent on the above subject, in last week's Journal, it is rather amusing to read that only now are they, in the Nantlle Valley, beginning to appreciate the system of cross-cutting their blocks of slate by saws, though plainly suggested by the late Mr. Greaves, of Festiniog, more than 20 years ago. Considering the predicament those quarries are in, with rubbish tips, &c., one would have almost expected that there was someone connected with them far-seeing enough to have shown that even Mr. Greaves' system of bringing out unshaply masses, like a dead horse without the legs, showing the effects of explosives, and then splitting them into pieces 3 to 4 in. thick, to suit the present system of cross-cutting, is very far from what may be done in Nantlle and elsewhere. I should advise those interested in the 20 per cent. reduction to do as the farmers do—take the plough to the land, not the land to the plough; the saw to the rock, not the rock to the saw.

Egham, July 15. GEORGE HUNTER.

NON-ELECTRIC INSTANTANEOUS FUSES.

SIR,—The instantaneous fuses of Messrs. Bickford, Smith and Co. have lately been tried at the quarries of the Pant Glas Slate and Slab Company, near Llangollen, North Wales, and have given the greatest satisfaction. We found that by using them there is a great saving of time, powder, and money. The harder the rock the better they answer, and as much work can be done in a day by their help as formerly could be done in a week without. The holes can be bored further from the face of the rock, and the further back they are bored the less likely are the blasts to be spoiled by some flaw or crack in the rock; there is less danger of men being hit by falling debris, as large masses of rock are split off instead of small bits being hurled to a distance. The men too need not stop work so often to get under cover. The fuses we found to be very simple and safe, and their action easily understood. The quarrymen have decided to use them, which, as they pay for them themselves, speaks well for their practical utility. F. E. R.

COMMERCIAL SOCIETY OF GEOGRAPHY.—An influential meeting, presided over by Mr. Westgarth, was, by permission of the Lord Mayor, held at the Mansion House, on Tuesday, for the purpose of discussing the advisability of establishing in the City a Commercial Society of Geography, with a view to give to commerce similar assistance in the way of geographical knowledge to that which the Royal Geographical Society affords to science. The originator of the proposal in explaining the intention of the institution said that some of the principal objects of the society would be to collect from all portions of the globe information of a geographical character having a bearing upon commerce; to establish a library of reference and a map room easily accessible to city men during business hours; to form by degrees a museum of raw and manufactured products; to discover and aid in opening new markets for British goods and sources of supply of raw materials, and to support as far as possible all commercial geographical explorations. Objections had been raised in some quarters that the undertaking was too vast, and that it would interfere with the Royal Geographical Society. These objections, he contended, had no weight. The undertaking was certainly a vast one; but it was urgently required, for in no other country was there such an ignorance of geography as in England, although we were the greatest commercial nation on the face of the earth. On the Western Coast of Africa the Germans, owing to their superior knowledge of geography, had been enabled to obtain a great deal of the trade of that part of the continent into their hands. In conclusion, he moved a resolution declaring that the proposed society was urgently needed, and deserved the support of the entire mercantile community. Mr. Manley Hopkins, Consul-General for the Hawaiian Islands, seconded the resolution, which was supported by Mr. Hyde Clarke and Mr. Dunlop, and agreed to. Mr. Hyde Clarke then proposed, and Mr. E. Matheson seconded, that a society of the character referred to be established, and that a committee be appointed to carry out the details. This having been carried, it was resolve to invite the Lord Mayor to become the President of the society, and a vote of thanks to his lordship for the use of the room concluded the proceedings.

REPORT FROM CORNWALL.

July 17.—Inactivity still continues to rule the share market, though there are several promising points for speculative operation, and there is no indication of any immediate change. Everybody now appears to be satisfied that tin must move ahead, and if tin of course shares; but there is no apparent inclination to act upon this belief, beyond the fact that those who have shares in leading mines are not disposed to throw them upon the market. We adhere to our opinion that investors should find this a favourable opportunity, properly worked. Apart from considerations affecting the future of Tincroft itself, the proceedings at the account were worthy of note from the expression of opinion by Capt. Teague, on the all-important subject of the price of tin. He holds what may be regarded as very decided views upon this matter. If the reduction in the stocks continues, and he believes it will, then the price of tin ought shortly to improve. Well, Capt. Teague is within the circle, and ought to know, if anyone, and he is very largely interested in bringing about this desirable end. It must come some time; but, as we have said, if appearances are of any value, it ought to have come long since, and why tin has not fetched a higher price is not to be explained, therefore, by any ordinary considerations.

As to Australia, Capt. Teague evidently thinks it has done its best and worst. Its tin production has, he says, fallen off one-third, and nearly as much money has been lost in tin mining there as here. The latter point, however, we must take leave to doubt. We doubt, too, the even cautiously expressed opinion that the tin production in Cornwall, with better prices, would not be materially increased. Why, if Tincroft alone only fulfils anticipations there will be a very material addition from that single quarter. Unquestionably there are limits to the productive capacity of the county; but seeing the manner in which Dolcoath, for example, has developed in depth, we should not be inclined to draw any hard and fast line for them.

Elsewhere Capt. Teague has commented upon the general absence of improvements in the prospects of the mines during the past few years. It would not be difficult, however, to prove that there have been a good many improvements, and it has recently been shown that what has been well called "the Great Flat lode district" is paying its way, while in the east of the county, as we pointed out last week, there is really a very marked advance, while an increase in the list of dividend mines is a thing of immediate expectation. How all this can be without material improvement in more directions than one it is hard to see; and we suspect Capt. Teague was thinking rather of Tincroft and Carn Brea, where improvements have certainly been sadly wanting, though the management has done all it can. However, there is now clearly hope for Tincroft, and we believe for Carn Brea also.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

July 17.—The coal market has not so far been strengthened by the colliers' strike to any noticeable extent. Those collieries that are at work either at the old rate of wages, or subject to the terms which may ultimately issue of the struggle, are busy. But the supplies from the Chase and from outside districts, even as far as Leicestershire, are so abundant that low prices have still to be accepted. Sales of pigs have not this week been conspicuous, yet small transactions have been recorded in inferior qualities at easy prices. Derbyshires are 42s., and the Thorncliffe brand is quoted without business at 55s. Native part-mines are 45s. down to 42s. 6d., and cinder pigs 40s. to 35s. as the minimum. The orders that have resulted to the finished ironmasters from the Quarterly Meetings are not of great account. Export orders in particular are difficult to get of any size, at prices which render them worth having. Common bars are 5*l.* 5s.; hoops, 6*l.* to 6*l.* 5s.; and sheets (singles), 6*l.* 15s. to 7*l.*

There does not seem much probability of the strike of colliers being brought to a speedy termination. The men appear to be still united in their resolve not to resume unless the old rate of wages is conceded, and they are making vigorous efforts to be successful. Appeals for help have been sent out to North Staffordshire, Lancashire, Derbyshire, Yorkshire, and the Cannock Chase districts. The amount raised up to the end of last week was not, however, very large, totalling, as it did, only some 300*l.* Meetings are still being held, at which the men are exhorted to continue on strike, and the never-failing resolution to "play on" is carried. The men are diligently propagating a statement that, out of the 16,000 colliers affected, only 6000 are out, the remainder being at work at the old rate. This statement the coalmasters, on their part, vigorously deny. Mr. E. Fisher-Smith, on behalf of the Earl of Dudley, is understood to be making arrangements to stop, when possible, the whole of his lordship's collieries, by discharging the enginemen and others employed at them, and, if it should be necessary, he will damp down or blow out the blast-furnaces.

The ironmasters met in Birmingham to-day and decided to give a month's notice for a further reduction in ironworkers' wages. This step has been taken consequent upon the reduction in the North. At the gathering of coalmasters it is determined to make a call of 1*l.* for each 10,000 tons of coal raised per year, 2*l.* for double that quantity; other subscriptions being according to quantities raised.

The Mining Accident Fund held a quarterly meeting at Wolverhampton on Wednesday. It was stated that the dividend account showed a credit of 93*l.* and the capital account 34*l.* Grants amounting to 9*l.* were made to widows whose husbands had met with fatal accidents. Mr. Benjamin Hingley, of Noah Hingley and Sons, was appointed a trustee of the fund, in the place of Mr. W. O. Foster, resigned.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

July 17.—It was without the least intention of referring to the meeting of the Royal Agricultural Society at Shrewsbury in this report that I entered the show yard yesterday morning. I had not proceeded far, however, before I became interested in matters which come within the province of the *Mining Journal*. A pile of slates which I recognised as Festiniog, a large quantity of slate blocks, partially covered with damp earth to keep them moist; a veritable Welsh slate quarryman engaged in splitting them and another occupied in dressing them by one of Owen, Isaac and Owen's dressing machines, formed a centre of great attraction to the public, and I need not add, to me also. On the other side of the yard too, as if in opposition, was a nice roof made of Madeley tiles, with an exceedingly nice terminal tile designed by Mr. Parson Smith, jun., of Shrewsbury. The beauty of the roof lay in this end tile, which should be seen to be appreciated. Stone crushers, Marsden's and Baxter's, were there in great force, and close by was one of Robey's semi-portable mining engines, with the works underneath the boiler. A dredging machine of Priestman's in active work in sand attracted much attention, as did also a beautiful model of telphesage, in active work, and which to me of course suggested the advantages which the invention would confer on mining in new or rough countries. The adaptation of terra-cotta to out-door garden ornamentation, and of the recently revived Shropshire pottery to the same purpose indoors, was also well displayed.

The preparations for the show have afforded a great deal of employment. The railway companies have constructed a siding, and they have had between 200 and 300 men employed and housed in tents for some time past. Apart from this, the prospects of labour are gloomy enough. In addition to the recent stoppage of the Bog, Pennerley, and Tankerville Lead Mines, rumours are afloat that it is intended to stop or suspend work at the Snailbeach Mine. This, of course, will be a far more serious calamity to the district than any that has occurred recently. The event hinges upon the price of lead, and not upon any scarcity of ore in the mine. The only mine then left working in the county will be the Roman Gravels. An alarming subsidence of land, involving the disappearance of a house, has taken place in the Cheshire salt district, and the feeling of insecurity is very great. A passage occurs in a recent work on mining to the effect—"What the end of all this will be it is difficult to say. It seems useless to build houses on moving and unstable ground, and it is probable that the district immediately concerned will be given up to agriculture and the production of salt, the dwellings being erected around the outer margin of the shifting area." Possibly the Droitwich plan might answer. There the houses are built on strong frameworks of wood. A successful experiment in electric lighting was conducted at the Maesbury Chemical Works, near Oswestry, on Monday, by Mr. E. H. Davies, C.E., the object being to show the adaptability of this method of lighting in this country to mills, quarries, and works generally where steam power is used.

It will be remembered that in January last Mr. Hall, the Government Inspector of Mines, brought a charge at Wrexham against the Bersham Colliery Company of neglecting to provide sufficient ventilation in their colliery. At that time the charge fell through through the divided opinion of the magistrates. The case was re-heard last Monday and Tuesday, when the charge against the colliery was unanimously dismissed, it having been shown that the company spared neither skill or expenses in providing for the thorough ventilation of the mine. The Cambrian Railway Company have issued a circular explaining the difficulty they have had in meeting the charges upon their lines, in which they say that in the year 1883 "the condition of the slate trade, the depression in agriculture, and other causes combined to produce a deficiency of 7363*l.* 18s." The year 1884 has brought a slight improvement. At the present moment there are rumours of a general strike of the slate quarrymen in North Wales, which it is to be sincerely hoped may prove unfounded. Nevertheless the wages of the workmen are now very low. The extension of the railway from Bishops Castle to Montgomery has been sanctioned by Parliament. This will provide a through connection between the West Midlands and Central Wales. There is no improvement in the local coal and iron trades.

TRADE IN SOUTH WALES.

July 17.—The amount of coal shipped at the principal South Wales ports in the month of June was as follows:—Cardiff, 581,936 tons foreign and 80,656 coastwise, with 8811 tons of patent fuel; Newport, 129,778 tons foreign, and 90,585 tons coastwise; Swansea, 74,336 tons foreign, and 69,095 coastwise, with 81,715 tons patent fuel. Last week Cardiff cleared 161,065 tons foreign and 19,180 tons coastwise, with 4700 tons patent fuel.; Newport, 26,039 tons foreign, and 18,415 tons coastwise; Swansea, 18,508 tons foreign, and about 14,000 tons coastwise, with 6756 tons patent fuel. The Sliding Scale Committee, having received the accountant's report, have declared that the wages will remain the same, as prices have not changed during the last four months. The Peninsula and Oriental Company's contracts have just been secured by several Cardiff firms, amounting in the aggregate to about 180,000 tons.

Messrs. Burt and Broadhurst, M.P.'s, addressed a mass meeting of colliers on Monday in the Forest of Dean. The payment of wages in public-houses and the need of additional Mine Inspectors were dwelt upon. So far the meeting may do good, but political questions seem outside the legitimate range of such gatherings, as all colliers do not hold the ultra views of Messrs. Burt and Broadhurst, and the bulk of their hearers have a very perfunctory idea of State matters.

The amount of iron sent away from Cardiff in the month of June was 8811 tons, while Newport shipped 8981 tons. Last week Cardiff shipped 2537 tons, and Newport 4990. Iron ore has been received at Cardiff to the extent of 4424 tons from Bilbao, and 2863 tons from other places; Newport landed 10,474 tons from Bilbao.

The Newport Abercarn Black Vein Steam Coal Company has just declared a dividend of 7 per cent., making with the interim dividend paid in January 10 per cent. for the year.

At Cyfarthfa the men are busy stacking Bessemer pig ready for making an early start with the steelworks.

At Dowlais the want of water is so much felt that it is feared the whole of the works may be stopped unless a plentiful supply of rain soon comes.

At Llantrisant it is expected that the Pontclown Tinworks will soon be started. The tin-plate trade is active, and prices are fairly remunerative. It is expected that this state of things will remain for some time, owing to the lowness of stocks.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

July 17.—The production of pig-iron in Derbyshire is now less than it was in the earlier part of the year, there not being so many furnaces in blast. The local consumption at the foundries does not appear to have fallen off, but the demand from other districts evidently has. The Stanton and Staveley Companies, however, have fully maintained their production during the year, both using a large quantity of what is made. A good deal of the pig is for foundry purpcses, especially gas and water pipes, and some other kinds of heavy castings. There is still a moderate output of merchant iron, and it is now expected that there will be before long a considerable increase of ordinary rolled iron at the Butterley Works, where there is an immense plant of a varied character. In malleable iron there has not been any marked change, the make of light castings being kept up to the average. The Messrs. Lucas, of Dronfield, who have long been noted for their malleable castings, and which were first turned out and patented at that place, are doing a steady business in steel spades and shovels, for which they are also noted.

There is nothing new to report with respect to the Coal Trade, which continues dull, so that the collieries are working short time all round, and are likely to be in the same position during the next two or three months. The business doing with the Metropolis has declined more than otherwise, there having been a marked falling off in the tonnage sent of late from Clay Cross, Grassmore, Langley Mill, Eckington, and others of the leading collieries in Derbyshire. This relates principally to house and gas coal, for a tolerably fair business has continued to be done in steam qualities, the railway companies in particular taking a full average. The quantity sent to the Metropolis is not large, and can scarcely pay the senders, seeing that it is delivered as low as 18s. per ton. Gas coal does not go off well, for the companies, as has been before pointed out, will not stock during the summer months, although it would pay them to do so, for they could get their contracts at a much lower price were they to agree to take larger supplies at a time when the collieries are working short time owing to the decreased consumption of house fuel. Coal for manufacturing purposes is still in but moderate request, and prices are unremuneratively low. There is a good deal of competition for the Lancashire trade in small coal, and the collieries connected with the Manchester and Sheffield Railway have the advantage over those who have to send over the Midland to the cotton districts of Lancashire, the distance being so much less. In coke no change has taken place, the production being far below what is consumed at the blast-furnaces, so that instead of the colliery owners making coke from their small and comparatively valueless coal, they allow the trade to fall into the hands of the South Yorkshire makers, who find it far more profitable than selling the raw material.

In some departments of the Sheffield trade a little improvement has taken place, which augurs well for the second half-year. The agreement come to by the English and continental steel rail makers to have a fixed price has been of some little benefit to Sheffield, for of late the production has increased. The two armour-plate establishments continue busy, and an extensive contract for the Cylops Works has been entered into with the Danish Government for the plating of a very large war vessel. Plates for ordinary shipbuildiag and boiler makes are still in rather moderate request, but hoop-iron is going off well, there being some rather export orders in hand. The cutlery branches continue quiet, and less is now being done in light agricultural and horticultural implements. Sheepshear makers are now fairly off for work, a good many orders coming from Australia and other of our colonies. In edge tools, saws, and files a

moderate business is being done, as there is also in small machine knives. Engine makers are now busier than they have been for some time past, whilst the foundries are better employed than they. Crucible steel makers are not turning out so much material as could be desired, but there is a fair output of wheels, axles, and ordinary steel forgings.

At the terrible railway accident which took place near to Penistone, on Wednesday, several well-known coal merchants were in the unfortunate train on their way to Barnsley to meet the colliery owners or their representatives. One of them, Mr. Wilson, formerly connected with a colliery at Silkstone, had a very narrow escape, although he had one of his thighs broken. Mr. George Dawes (owner of the Milton and Elsecar Ironworks), along with his wife, were also in the train, and were not injured.

REPORT FROM LANCASHIRE.

July 17.—What may be termed the preliminary steps in the direction of a strike in the West Lancashire district have this week been taken by the men at some of the collieries bringing out their tools, but the general feeling is that the dispute will not result in any very serious stoppage of the pits. The conference of miners' delegates held in Manchester this week conducted its proceedings in private, but judging from what has been allowed to transpire there would seem to be rather a consciousness of weakness which will act as a check upon any serious struggle being entered upon. The men have certainly never had less justification for opposing a reduction in wages, as they have been receiving 10 per cent. above the rates paid in other districts, whilst the coal owners are getting a less price for their coal than when they were paying 10 per cent. lower wages.

Business all through the Coal Trade of Lancashire continues very quiet, and so plentiful are the supplies, not only in this district, where heavy stocks are held at many of the collieries, but there is so large a surplus in the neighbouring coal fields of Lancashire and Derbyshire ready to come into the market here, that consumers have no ground for anxiety, and there is certainly no rush of orders being giving out in anticipation of the threatened strike. All descriptions of round coal are bad to sell and low in price, best Wigan Arley still averaging about 8s. 6d. to 9s. at the pit mouth; common sorts about 7s.; and Pemberton Four-feet coals 6s. 6d. to 7s., with common round ranging from 5s. to 6s. per ton, according to quality. Engine fuel is in moderate demand, but with the exception that the better qualities of slack are here and there rather scarce supplies generally are in excess of requirements, and burgy has a tendency to hang in the market. At the pit mouth burgy averages 4s. 6d. to 5s. per ton; best slack, 4s. to 4s. 3d.; and ordinary qualities 3s. 6d. to 3s. 9d. per ton.

In the Shipping Trade there is a tolerably fair weight of business being done; but the prices taken are extremely low, and there is any quantity of good coal offering at 7s. per ton, delivered either at the High Level, Liverpool, or the Garston Docks.

The Iron Trade continues in a depressed condition throughout all branches, and unfortunately it is not so much a question of price that operates against business being done as the general absence of requirements. Consumers have so little new work in prospect that low prices do not induce them to buy largely, and generally transactions are confined to the barest possible requirements. In pig-iron there is very little buying; local makers are kept fairly going with deliveries against contracts, but some of the district makers are accumulating heavy stocks, and both Lincolnshire and Derbyshire brands are being offered here at very low figures. For delivery equal to Manchester prices average about 42s. 6d. for local, and 41s. 6d. to 42s. 6d. for district brands, less 2½ per cent. The Quarterly Meetings have not brought any large accession of new business in finished iron. The demand continues very slow, and although some of the leading makers are holding firmly at 5*l.* 15s. as their minimum for bars delivered into the Manchester district, buyers with anything like good specifications for prompt delivery have no difficulty in placing orders at under this figure. Lancashire hoops are quoted at about 6*l.* 2s. 6d., and sheets at 7*l.* per ton delivered.

Engineers generally are being kept steadily employed, and machine makers are still well supplied with orders; but in most departments the weight of new work giving out is reported to be decreasing, and to secure orders prices have to be cut extremely low.

TRADE OF THE TYNE AND WEAR.

July 17.—There is little change in the general condition of the Coal Trade here; best steam coal is still in good demand, but large quantities of it have been shipped lately, and there is a slight lull in present requirements at Cronstadt and other foreign markets. The demand for second-class steam coal is also rather quiet at present, but there is still a fair demand for bunker and steam small. In Durham the demand is not sufficient to keep all the works fully employed, only the best house, gas, and coking coal works are kept up to full time. The demand for house and gas coal is, however, improving, and this will continue as the season advances. The greatest deficiency is found in the demand for coking and manufacturing kinds.

The Thornley and Wheatley Hill Collieries, &c., have not yet found a purchaser, and there is certainly now a possibility that they will be closed for some time. It is to be regretted that such a good field of coal should lie dormant. The engines and extensive plant on the works are now advertised to be sold by auction.

The Northumberland and Durham Miners' Relief Fund held its 22nd annual meeting in the Miners' Hall, Durham, on Saturday. Upwards of 250 delegates were present. The report shows that 3000 members have been added to the society last year, the total number at present being 85,000. The contributions from the members show an increase of 6000*l.* on the year. The amount paid by the owners of colliers has also been increased a little during the past year. The number of deaths from accidents have been 152, under two per thousand, which compares favourably with the general death rate of the country. The number of widows who had come on the fund during the year had been 89, children, 161. The cost of permanent disablement allowance still increased. It is a pleasing fact to record that they were able to pay the sum of 15,000*l.* a-year, and that about 100,000*l.* had been paid in this department for the last ten years. The number of members in each department are as follows:—Widows, 750; children, 1296; permanent disabled, 380; aged and infirm, 1569: total, 3995*l.* The number of persons claiming for minor accidents during the year had been 13,500. The income of the society—Contributions of members, 59,103*l.* 17s. 11d.; owners' contributions, 4500*l.* 0s. 9d.; honorary subscriptions, 278*l.* 7s. 7d.; interest on investments, 3777*l.* 16s. 11d. The total expenditure had been 59,110*l.* 15s. 11d., showing a balance on the year's account to the benefit of the society of 8349*l.* 7s. 3d., which added to last year's balance showed the capital account of the society to be 11,221*l.* 2s. 1d. There was no disastrous explosions during the year, such as happened in 1882-3. On the whole the society has proved to be very successful. The colliery owners have been asked (that is those who do not at present contribute) to contribute to the funds, and the question is now before them; a reply from them being expected shortly. After the passing of the Owners' Liability for Accidents Act, many of the owners ceased their contributions, but the feeling on this question is now believed to be passing away.

The Iron Trade has been very dull during the present week. The Quarterly Meeting gave no impetus to business. There is very little pig-iron bought at present, and shipments are only moderate; it is feared that the shipments for the month will not be sufficient to cause a reduction of stocks. There is no change in the value of pig-iron or any other description of iron. The state of general commerce, the short employment for ships, and the small amount of work in the shipyards, which it is feared will be still further reduced, has a most injurious effect on the iron, coal, and many other collateral trades. At Blaydon and other localities on the Tyne and Wear the collapse of the iron shipbuilding trade has had a most depressing effect, as specialities are manufactured for this trade at many of these works. Founders, bridge-builders, and makers of locomotive and other engines continue to be well employed. The position of many of the large iron and other works here has never been considered satisfactory since those companies were converted into limited companies a few years ago, generally the dividends paid have been small, and, consequently, the price of the shares has been also small. The present depression will, of course, have a bad effect on the value of many of these works.

The meeting of the Society of Chemical Industry, held in Newcastle during last week, attracted much attention. Mr. Walter Weldon, F.R.S., the President, is the inventor of the process by which nearly the whole of the chlorine made in the world is now manufactured. Chlorine is the essential constituent of bleaching powder, of which commodity, in good times, 40,000 tons per annum are manufactured on Tyneside, the total production in Great Britain being about 140,000 tons per annum. Chlorine is a green gas, and bleaching powder is made by causing slaked lime to absorb half its weight of that gas. Bleaching powder is largely used for sanitary purposes, but mainly in the manufacture of paper and in bleaching textile fabrics; and hence the great French chemist, J. B. Dumas, in presenting Mr. Weldon, on behalf of the Société d'Encouragement its "grande médaille," which has only been given to four other persons—Count Ferdinand de Lesseps, Bousingault, Henri Giffard, and Henri Ste. Claire Deville—congratulated him upon having "cheapened every sheet of paper and every yard of calico made in the world." The first experiments made on the Weldon process were conducted at Walker-on-Tyne about the year 1866. The first step in the manufacture of soda also, as conducted by the classical Leblanc process, was first employed in England at the Walker Works, and this process is still continued on the Tyne. The late Mr. Losh and Lord Dundonald led the way on the Tyne in these important manufactures. Mr. Weldon has introduced many other improvements in this manufacture. It is expected that in the address which he will deliver on Wednesday he will deal with some further probable developments of the chlorinic manufacture. For the invention by which Mr. Weldon is best known he has recently been nominated by the French Government Chevalier de la Légion d'Honour. He is a vice-president of the Chemical Society, and also of the Institute of Chemistry.

This society was founded in 1881, in July, and in July, 1882, the number of members was 1140, and at present the number is 1800. The society at first consisted of two sections, one in London and one in Liverpool. In the next year a section was formed in Manchester, and the Newcastle Chemical Society, which had been in existence 15 years, became the Newcastle section, and last year sections were formed in Birmingham and Glasgow. These sections, formed at the principal seats of chemical manufacture in the kingdom, hold meetings periodically, at which papers relating to technical chemistry are read and discussed, and the whole society meets annually at one of the centres of this industry. The first annual meeting was held in 1882, at Manchester, Professor Roscoe in the chair; the second in London, under the presidency of Sir Frederick Abel, and the third commenced on Wednesday, with Mr. Walter Weldon, F.R.S., in the chair. The committee of the Newcastle section, under the chairmanship of Mr. J. C. Stevenson, M.P., have done their utmost to ensure the success of the meeting.

The meeting was brought to a close on Friday; it has been a very successful meeting. The leading feature in the address of the President bears on the manufacture of soda. He remarked that of late years the ammonia process has continued to advance rapidly, and the making of soda by the Leblanc process has about served its time, as it is about 70 per cent. more costly than the ammonia process, and its only claim to continue to live consists in the fact that it yields hydrochloric acid, and this is the raw material of the chlorine manufacture, so that for the manufacture of chlorine we are entirely dependent on the Leblanc process. But attempts are now being made to obtain the material for making chlorine in connection with ammonia soda, and it is hoped that these efforts are approaching a successful result.

The members of the society visited, on Thursday, the leadworks of Messrs. Locke, Blackett, and Co., St. Anthony's, when the excellent plant for smelting lead ore and extracting zinc and silver, the rolling of sheets, and manufacture of lead pipes, &c., was witnessed. A visit was then made to the extensive chemical works at Gateshead, belonging to the Newcastle Chemical Company. These works were founded by Mr. Allhusen, and operations were commenced in 1834, and in 1872 they were transferred to the present company. The works now cover an area of 62 acres. Soda is manufactured by the Leblanc process: 30,000 tons pyrites are burnt annually, producing acid sufficient to decompose 50,000 tons of salt per annum. It is not necessary to enter into details of the various manufactories; we may observe, however, that in the decomposing department some hand furnaces are still being worked, but these are being rapidly superseded by mechanical furnaces; one at present in operation treated more than 13,000 tons of salt last year. The constant tendency in all kinds of manufacture is to substitute machinery for hand labour.

The hydrochloric acid evolved in the manufacture of sulphate of soda is absorbed by water in large towers, and conveyed to stone stills, when it is brought into contact with peroxide of manganese, yielding chlorinic gas and chloride of manganese liquor; the latter is regenerated by the well-known Weldon process. The chlorine is conveyed by means of pipes to lead chambers, where it is absorbed by hydrate of lime, or bleaching powder—about the most important article of commerce produced. These works produce annually soda ash about 20,000 tons; soda crystals, 30,000; refined alkali, 7000; bleaching powder, 15,000 tons.

In connection with the works there is a large cooperage, fire brick-works, gasworks, and repairing shops, the total number of hands employed being about 1000. On Friday the chemical works of Messrs. Tennant, at Hebburn, were inspected, and also the Tharsis Sulphur and Copper Company's Works. The works of Messrs. Tennant are very compact and finely arranged, being comparatively modern. At these works, which have been in operation 20 years, they saw the process of the production of copper from the residue of the pyrites from the chemical works. This residue treated with salt and calcined is treated for the gold and silver, and then passes into tanks filled with scrap-iron. The copper precipitate follows, and this then passes to the smelting furnaces. The copper is sold in ingots, cakes, and wire bars. In the chemical works the products are bleaching powder and soda, the total make here being about 800 tons weekly. Hand labour has been abolished, and four of Mactear's furnaces decompose the whole of the salt. The leadworks of Messrs. Cookson and Co. were next visited. The works are for the smelting of lead and its desilverising. The furnaces when fully charged will hold 1200 tons of lead. Exhibits of the raw material and finished products were shown, prominent being a cake of silver, computed to be worth 2200*l.*, and weighing over 6 cwts.

The Chemical Trade here continues to improve, and the main products are advancing in price. Bleaching powder has again reached 9*l.* per ton. The Papyrus Fibre Company, South Shields, has been established. The company, which was brought forward at a very depressed time, at a time, indeed, when the public were not inclined to look at anything new, has been floated, and it will soon be in active operation.

MASON COLLEGE.—At the Council Meeting, on Wednesday, scholarships of 30*l.* each, tenable for one year, were conferred on the following students of the college:—Frederick Daniel Chattaway, Walter Bernard Challen, and Alfred Featherstone Kellett. An extra scholarship of 20*l.*, for one year, was conferred on Jessie Edwards, "in consideration of her distinguished place in the examinations in various departments of the college." The junior engineering diploma was awarded to Arthur Woodroffe Manton, who was also elected to the technical scholarship in engineering, tenable for one year. Mr. Manton has thus won the first "Tangye" scholarship. The title of "Scholar of the Mason Science College" was conferred on Alfred Bernard Badger, he having obtained a position in the college examinations qualifying him for one of the scholarships; but being unable to continue a member of the college classes, having become a scholar at New College, Oxford. At the recent matriculation examination of the University of London. Frederick Daniel Chattaway was placed in the first class, and Oswald Wynne Thomas in the second class.

FOREIGN MINING AND METALLURGY.

The intelligence received with respect to the French Iron Trade is of much the same charater as for some time past. The works suffer from a scarcity of orders; pig has been almost unsaleable, and stocks show a tendency to increase. If the French steelworks attempt to compete with those of Belgium they will have to do so upon excessively low terms. The general condition of the German iron trade remains unchanged. The steelworks continue well employed, but the demand for pig and iron has left a good deal to be desired. The production of the German blast-furnaces in May is returned as follows:—Puddling pig, 182,950 tons; spiegel pig, 11,071 tons; Bessemer pig, 40,472 tons; Thomas pig, 40,685 tons; and casting pig, 28,340 tons. The corresponding production in May, 1883, was as follows:—Puddling pig, 169,972 tons; spiegel pig, 8966 tons; Bessemer pig, 38,923 tons; Thomas pig, 35,985 tons; and casting pig, 25,394 tons. A small adjudication of steel rails has just taken place at Cologne. Krupp, of Essen, took 500 tons at 7*l.* 9s. per ton. Prices have not generally varied upon the German markets during the last few days. It appears that the heaviest import duties imposed by Russia on foreign coal entering that country will be levied on coal arriving at ports on the Black Sea and the Sea of Azoff.

There has been no important change in the general tone of the Belgian Iron Trade. There has been what the Belgians term a slight "recrudescence" of orders, but prices have shown continued weakness, and there appears little hope of an improvement in this respect under existing circumstances. Pig has rather fallen during the past month, and it may now be purchased at about 2*l.* per ton. Some important transactions have taken place at this price. English casting pig has made about 2*l.* 3s. per ton upon the Belgian markets. Refining pig hard iron has made 2*l.* per ton; ordinary ditto, 1*l.* 16s. per ton; and mixed ditto, 1*l.* 12s. per ton. As regards iron, No. 1 has made 4*l.* 10s. per ton; No. 2, 4*l.* 16s. per ton; and No. 3, 5*l.* 2s. per ton. Girders have brought 4*l.* 16s. to 5*l.* per ton; No. 2 plates have made 6*l.* 4s. per ton; No. 3 ditto, 7*l.* per ton; and No. 4 ditto, 10*l.* 4s. per ton. The current quotation for plates of commerce has been 8*l.* 12s. per ton. The imports of iron minerals into Belgium in the first half of this year were 647,850 tons, as compared with 620,263 tons in the corresponding period of 1883. The exports of iron minerals from Belgium in the first five months of this year were 79,658 tons, as compared with 183,570 tons in the corresponding period of 1883. The exports of steel rails from Belgium in the first five months of this year were 16,512 tons, as compared with 15,005 tons in the corresponding period of 1883.

The Belgian Coal Markets have presented rather a favourable tone as regards household coal, but the outlook has been less encouraging as regards coal for metallurgical purposes. Upon the whole coal owners do not appear to have much reason to complain. This remark does not apply, however, to coking coal, which has continued to show a downward tendency, especially in the Centre. The imports of coal into Belgium in the first five months of this year amounted to 491,294 tons, as compared with 485,742 tons in the corresponding period of 1883. In these totals English coal figured for 100,51[illegible] tons and 117,551 tons respectively. The imports of coke into Belgium in the first five months of this year were 15,972 tons, as compared with 15,727 tons in the corresponding period of 1883. The exports of coal from Belgium in the first five months of this year were 1,884,398 tons, as compared with 1,617,292 tons in the corresponding period of 1883. In these totals the exports to France figured for 1,782,621 tons, and 1,510,799 tons respectively. The exports of coke from Belgium to May 31 this year were 363,033 tons as compared with 454,019 tons in the corresponding period of 1883. In these totals the exports of coke to France figured for 328,804 tons and 398,541 tons respectively. Prices have not varied upon the German coal markets; there has, at the same time, been rather more firmness, in consequence of the favourable course of the export trade.

INSTITUTION OF CIVIL ENGINEERS.—The Council have awarded the following premiums in respect of the original communications submitted during the session 1883-1884, for papers read at the ordinary meetings:—A Watt Medal and a Telford Premium to Sydney Walker Barnaby, Assoc.M.Inst.C.E., for his paper "On Hydraulic Propulsion;" a Telford Medal and a Telford Premium to Samuel Bagster Boulton, Assoc.Inst.C.E., for his paper "On the Antiseptic Treatment of Timber;" a Telford Medal and a Telford Premium to William Foster, M.A., F.C.S., for his account of "Experiments on the Composition and Destructive Distillation of Coal;" a Telford Premium to William Tregarthen Douglass, Assoc.M.Inst.C.E., for his description of "The New Eddystone Lighthouse;" a Telford Premium to James Atkinson Longridge (has previously received a Telford Medal and also a Watt Medal), M.Inst.C.E., for his paper "On Wire-Gun Construction;" a Telford Premium to William Hackney (has previously received a Telford Medal), B.Sc., Assoc.M.Inst.C.E., for his paper "On the Adoption of Standard Forms of Test-Pieces for Bars and Plates;" the Manby Premium to George Henry Stayton, Assoc.M.Inst.C.E., for his paper "On Wood Pavement in the Metropolis." For papers printed in the proceedings without being discussed a Telford Medal and a Telford Premium to Thomas Andrews, Assoc.M.Inst.C.E., F.R.S.E., for his paper "On Galvanic Action between Wrought-Iron, Cast Metals, and various Steels during Long Exposure in Sea Water;" a Telford Medal and a Telford Premium to Francis Collingwood, M.Inst.C.E., for his paper "On Repairing the Cables of the Allegheny Suspension Bridge at Pittsburgh, Pa., U.S.A.;" a Telford Premium to James Henry Apjohn, M.A., M.Inst.C.E., for his notes "On the Area of Sluice Openings necessary for the Supply Sluice [of a Tidal Canal; a Telford Premium to T. Gillott, M.Inst.C.E., for his paper "On the Basic Open-Hearth Steel Process; a Telford Premium to James Wm. Wyatt, Assoc.M.Inst.C.E., for his communication "On the Art of Paper-making by the Machine as exemplified in the Manufacture of High-Class Writings and Printings;" a Telford Premium to William Santo Crimp, Assoc.M.Inst.C.E., for his account of "The Wandle-Valley Main Drainage." For papers read at the supplemental meetings of students—The Miller Scholarship to Alfred Richard Sennett (has since been elected an Assoc.M.Inst.C.E.), Stud.Inst.C.E., for his paper "On the Electric Light;" a Miller Prize to Peter Chalmers Cown, Stud.Inst.C.E., for his notes on "The New York, West Shore, and Buffalo Railway, and the Methods used in its Construction;" a Miller Prize to Walter Osmond Rooper, Stud.Inst.C.E., for his account of "Emery Wheels, and Emery Wheel Machinery;" a Miller Prize to Richard Morcland (*tertius*), Stud.Inst.C.E., for his paper "On Construction in Ironwork for Buildings;" a Miller Prize to Edward Woodrow Cowan, Stud.Inst.C.E., and a Miller Prize to James Fawcus, Stud.Inst.C.E., for their joint paper descriptive of "A Light-Draught Launch."

SELF-ADHESIVE BOILER JACKETING.—Among the numerous cements from time to time introduced for the purpose of covering boilers and steam pipes that of Messrs. SMITH and COMPANY, Burton-on-Trent, to judge from the long list of users which they are enabled to give, certainly appears entitled to be regarded as one of those in high favour. They use a good non-conducting, heat retaining and self-adhesive composition for ordinary covering purposes, while they have special compositions for hot-blast pipes at ironworks and for covering steam pipes in wet mine shafts and the like. The cements are sent out in casks ready mixed for laying with the trowel when dry they are compact, hard, and light, having a smooth surface for painting or tarring. They are incombustible. They will not corrode metal, but protect it from the weather and unequal expansion, saving from 10 to 25 per cent. of fuel, by stopping radiation. If only one-half of these claims are borne out in practice, and the testimonials may be referred to as evidence that they really are, no boiler ought, assuming any jacketing to be used, to be allowed to waste steam that can be utilised.

IRON AND MANGANIFEROUS ORES.—Messrs. H. BORNER and Co. (Cardiff, July 16) write:—The iron ore market remains lifeless, little or no business having been done during the past week in consequence of the irregularity of freights through the imposition of quarantine. Rubio is quoted at 11s. 11s. 6d. c.i.f. Cardiff or Newport. Freights from Bilbao are about 5s. to 5s. channel. Manganiferous ore dull. There is rather a better tone in the manganese market. Ferro-silica and ferro-phosphorus unchanged.

DANUBIAN COAL AND IRON COMPANY.

The fact of this company being in process of formation has already been announced, and it was mentioned in the *Mining Journal* a few weeks since that Mr. W. W. Kenrick, M.E., of Ruabon, had been engaged to visit and report upon the company's property. The prospectus will now be ready for issue very shortly, and in the meantime a few extracts from Mr. Kenrick's report will be generally acceptable. The estate, rich in coal, iron, and other metals, is, he says, situated on the northern bank of the noble river Danube, which forms its southern boundary, extending inland up the very picturesque and romantic valley of Tistovitza, and for some miles beyond the Bohemian village of Eibenthal, which rests upon the foot ridge of a mountainous chain forming a portion of the southern Carpathians, and rising to elevations of 1000 to upwards of 2000 ft. above the river. The hills and valleys are covered by excellent forests of oak and beach, and timber to any extent is available for use by a payment of merely nominal tax to the Government. The coal mines are situated at the upper end of the valley, above Eibenthal, near the pretty village of Ujbánya, belonging to the company, for the use of their employees. The position is about 1200 ft. above the river, and approached by a well-constructed road branching out of the Great Szechényi highway, which runs along the banks of the Danube, and also by a railway the property of the company down to the river, about 10 miles in length.

The property consists of 66 grubemassen of 11 acres each, and 92 frieschurfs of 125 acres each, estimated in English measurement to be over 10,000 acres, on and under which all mining rights are conceded for ever; liable to a Government tax of 4 fls. per grubenmass and frieschurf yearly, the Government taxes upon the entire property amounting only in English money to 100*l.* per annum. The estate is, therefore, practically freehold, all rights and concessions having been duly bought up for a large sum of money, and thus freeing the property from all liabilities whatsoever, and obtaining for it valuable rights as to the use of timber upon the Crown lands, and other local privileges. I may here state that the rights and titles of property owners in Austria-Hungary are very simple and clear, all being registered in the Government Grund Book, thus being indisputable. The property can also be transferred at will, and anyone so desiring can there ascertain the correctness of the foregoing facts. The coal measures were originally discovered about 1840, but nothing was attempted in the way of development until the late firm, Messrs. Lyall and Co., became interested in the property in 1872. Since this date to the present time they have expended their entire capital in the opening out of the works and rendering them accessible to the market, also in the purchase of all the rights and concessions before referred to.

The quantity of coal sent to market has been very limited, and as taken from the office books amounts only to about 25,000 tons, for which a total outlay of 91,000*l.* is shown to have been expended chiefly in the following manner:—The opening up and proving of the Donau and the Wenzel seams of coal, and latterly of the John Edward. The erection of the plant, engines, and machinery. The building of the village of Ujbánya, capable of accommodating 300 workmen, manager's residence, offices, and other buildings. The building of a railway line 10 miles in length, with shipping stages, &c., on the Danube. The purchase of the moveable and fixed plant, live and dead stock, together with the sum of nearly 30,000*l.* for the purchase of all the rights, concessions, and royalties with the freehold land.

The system of working has been a succession of galleries at different heights, the upper one being first worked, and then the lower ones in succession. The Wenzel seam has been worked by commencing with the outcrop at three different heights several metres apart, in 50 ft. widths, the coal from the upper heights being passed down slants to the bottom level. The upper heights of coal in this seam not yet worked will be wrought out cheaply by the means of an adit level driven in the rock strata at the lowest level. The average quantity of good coal obtained for market is 60 per cent., but by improved system of working, this percentage can be much increased, and brought up to 90 per cent.

The quality of the coal is similar to that found at Steierdorf, in very similar stratificati on, and is the most esteemed in Hungary, equaling the best English coals, and giving 26·000 English heat units and is much in request. It is very pure, burns without any smell, with a short flame, and giving a high degree of heat (as above stated) leaves very little ash, and does not adhere to the bars or make any smoke. In appearance it is very like the South Wales smokeless coal, and may be described as semi-anthracite. It will be found very suitable for the production of iron, a most important element in the near future. It is well liked for household consumption, owing to its lasting qualities, and for burning in the iron and porcelain stoves, which are in general use throughout the country, it is well adapted.

I estimate the quantity from the various sources available, and that obtainable upon the completion of the plans suggested, at about 4,000,000 tons, independently of what may be obtained from other sources, or from the working of the John Edward seam, which is considered the most valuable. For in addition to the coal owned by the company there are most valuable measures in concessions adjoing their property, available only by themselves, which they will shortly be able to obtain at a nominal sum. The coal thus available can be worked by surface adits at a very low cost, and without scarcely any outlay. Thus the output of coal would be very considerably increased by this addition to the Ujbánya Mines, and the fixed charges reduced *pro rata*. In my estimate, therefore, I embrace coal desirable from this source, and couple same with Ujbánya.

The following calculation is based upon an output of 150 tons per day, calculating the charges such as management, salaries, &c., at a fixed sum per month, and upon a basis of 42 weeks' work in the year. After making ample allowance for incidentals, and the unforseen, I make the total cost delivered at the shipping port to be 7s. 6d. per ton, as per the following statement. Cost of working translated into English, and made out and arranged upon the English system:—Getting coal, 1s. 8d. per ton; packing and timbering, 3d. per ton; stores, &c., 4d. per ton; washing and loading, 4d. per ton; hauling, winding, and pumping, 5d. per ton; dead work, 6d. per ton; mechanics' and general labour. 4d. per ton; railway maintenance, 2d. per ton; railway transport, 10d. per ton; loading into barges on river at junction, 6d. per ton; management, agency, &c., office and travelling, &c., 8d. per ton=6s. per ton; held for depreciation, &c., and new work, 8d. per ton; interest on capital of 50,000*l.* at 5 per cent., 10d. per ton=7s. 6d. per ton, total delivered on board steamer.

I estimate, in addition and exclusive of the purchase-money paid for the estate, that there will be required—For sinking the present shaft to bottom of basin (machinery being on hand), referred to in report as No. 1, 800*l.*; small locomotives for line, 750*l.*; steamer and barges, 10,000*l.*; additional rolling-stock, 1200*l.*=12,750*l.*; working capital, 8000*l.*=20,750*l.* The basis upon which I assume its value being the cash paid for the purchase of the concessions, rights, and royalties by the late owners, with sundry other values—Cash paid for concessions, &c., 20,892*l.*; purchase of fee simple in preference to a yearly payment, 12,800*l.*; railway from Ujbánya to Danube, with freehold land and concession from Government, 10 miles in length, 15,000*l.*; fixed and loose plant, rolling-stock, stoves, live and dead stock, as per detailed inventory and estimate, 3200*l.*=51,892*l.*; less 10 per cent. depreciation, 5189*l.* 4s.=46,702*l.* 16s.

It is not only in the coal measures that the return of the capital invested must be looked for, but also from the production of iron, and the utilisation of the immense and valuable deposits of iron ore just recently discovered—blackband, spathic ore, and brown hematite ore—which contains from 60 to 70 per cent. of pure iron, and are workable open-cast from the side of the company's railway, within a distance of ¾ mile from the collieries. These exist in large deposits upon the property, and are well adapted, from their component parts, for the manufacture of the best description of iron and steel. The freehold land on the Danube, at the termination of their railway, is well situated in every way for the erection of furnaces, limestone being abundant and more easily worked than in England. The masses of spathic ore and argillaceous ore have only been just explored. There is a great and increasing demand for iron, and at prices which will leave a clear profit of 2*l.* per ton, as, owing to the high protective tariff, pig-iron is now selling at 5*l.* per ton; bars, 11*l.*; and sheets, 17*l.* per ton; and contracts can be now accepted for all that can be produced at these figures for some time to come. It must be remembered that no iron industry exists in Roumania, Bulgaria, or Servia, and that these countries are therefore dependent upon outside supply. It can thus be readily seen, therefore, that, with the low price of labour and the abundance and proximity of the raw materials combined, there is in this industry an even greater return and source of revenue than that of the coal fields, which, as I have before stated, would amply repay the amount of the capital to be invested many times over; but, with the two industries combined, I believe it can be made one of the most profitable investments that could be ever undertaken.

To sum up, I can but repeat that the Ujbáuya coal mines from their natural position on the Danube, their immense deposits, coupled with the superior quality of the coal, present a field for investment that is rarely met with. While in England collieries are struggling for existence, and in most instances selling their produce for less than it costs to obtain it, the Ubjánya coal field has at command an ever-increasing market, which leaves a profit to the investors nearly double the cost of production. All that is required to obtain this very desirable result may be summed up in a very few plain words—a limited amount of working capital with proper and competent management. This is not my own opinion only, but that of other competent engineers, together with Mr. Hantkin (before alluded to), who have had occasion to study the property containing these mines. As the navigation on the Danube improves (and such being the desire of the Roumanian and Hungarian Governments) the value of this property will surely and rapidly increase, and it is certain that a splendid future is in store for the Danubian Coal and Iron Company.

DISTINGUISHING IRON FROM STEEL IN SMALL PIECES.—An interesting little note on this subject in Dingler's Polytechnisches Journal has been translated by Mr. W. F. Worthington, U.S.N., for the Journal of the Franklin Institute. A new fracture ordinarily furnishes the means for classifying test pieces, but its appearance is not a sufficiently safe guide in dealing with good, fine-grained iron or very soft steel. In order to effect the separation with ease and certainty in such cases, Walrand has given a simple method, page 531, "Proceedings of the Société des Ingénieurs Civils," Paris, 1883. It is by observing the fracture of the test piece after heating, and allowing it to take a blue colour. The trial can be thus conducted:—Take a test piece about 25 or 30 centimetres long, and make a slight scratch about 4 or 5 centimetres from the end. Then heat one end slowly and uniformly to a dark red colour (325° to 400° C.) and cool it in water. During the cooling, while the piece is still warm, it must be rubbed with a file from time to time, until the shining metallic surface laid bare has assumed a dark yellow, or better, a blue colour, when it is to be cooled quickly and completely. The fractures of the piece broken at the mark serve for comparison. Ordinary wrought-iron broken when cold appears fibrous or crystalline; but treated as above its fracture is dull, irregular, and of short fibre. Hard and moderately hard steel are fine grained; after the heating and subsequent treatment they have a shining, totally, or partially smooth fracture. Swedish iron has only the traces of fibres, and is hardly to be told from soft steel; after treatment the fibres become distinct, the smooth appearance is lost, and the iron becomes so much the more distinguishable from soft steel treated in the same manner.

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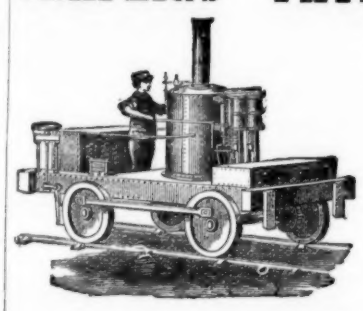

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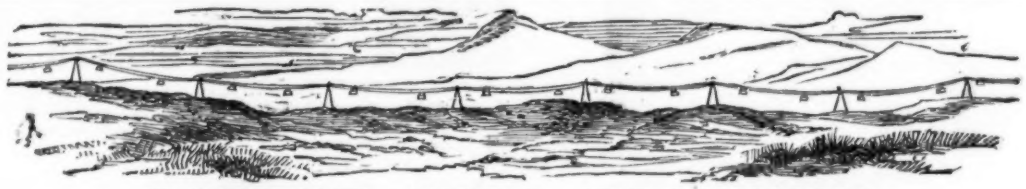

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EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.
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Of the MOST APPROVED AMERICAN PATTERNS.

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Of the most approved German pattern and arrangement, or with Stamps and Frue Vanner Concentrators for low grade silver ores, light in lead. We have over 20 large German pattern mills at work on lead, zinc, or copper ores, and numerous Vanner mills on ores never before successfully concentrated.

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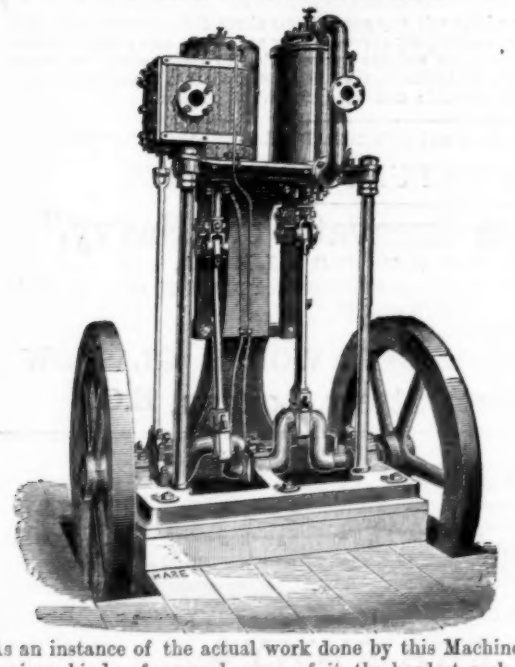
THE

"Champion" Rock-borer

AND AIR COMPRESSOR.



As an instance of the actual work done by this Machinery in various kinds of ground, some of it the hardest rock, it may be mentioned that in Cornwall, irrespective of the work performed by the "Champion" Rock-borers and Air-compressors purchased by various Mines, the drivage, rising, sinking, and stoping done by contract by the Proprietor with his own Machinery now amounts to over 1150 fathoms.

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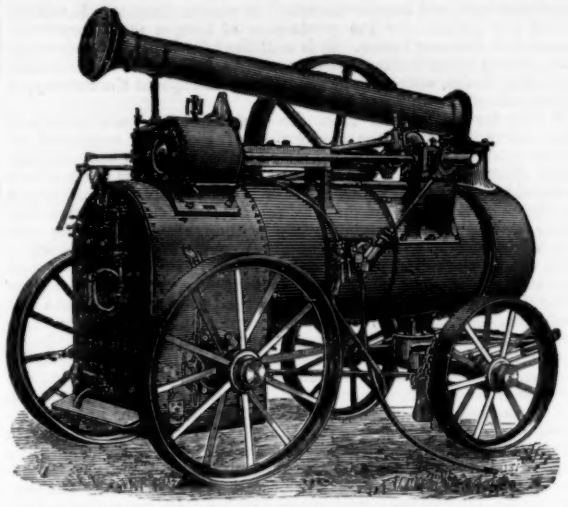

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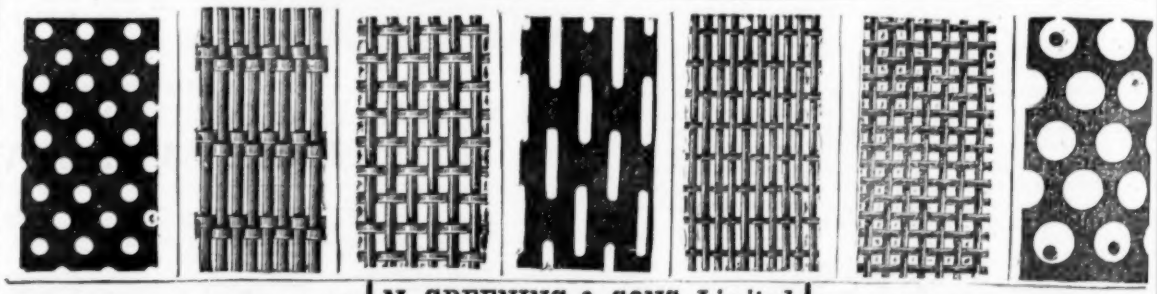

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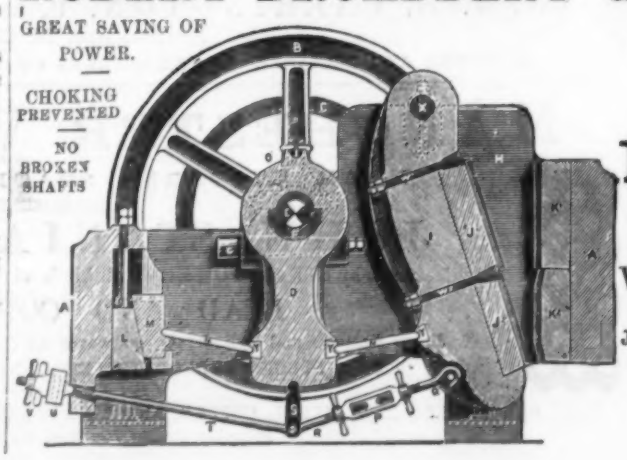

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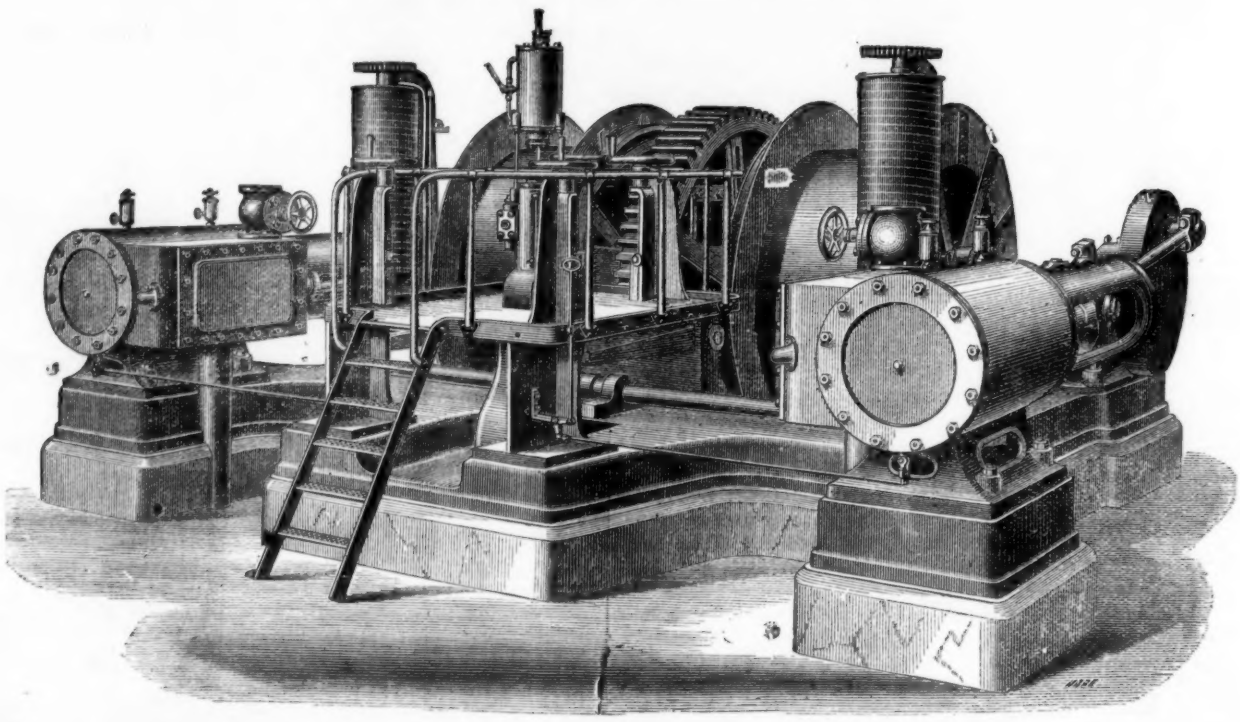

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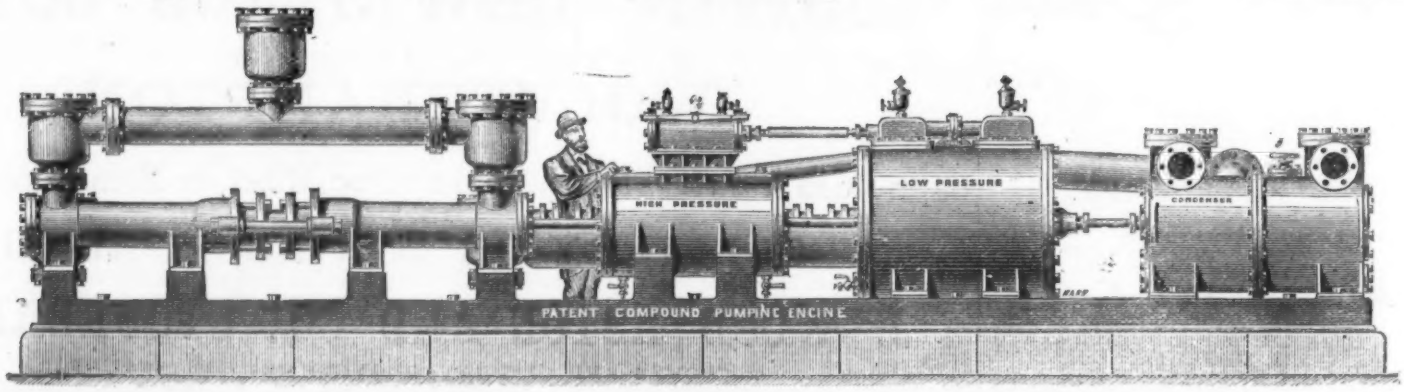

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"Our experience is that the motion and mechanical arrangements of your machine are the best for pulverizing that we have ever met with."

"The reports from our mines as regards the working of your Fine Crusher (20×5) recently supplied are very favourable, although we cannot quote you exact figures. On being got into position it was tried *by hand*, with the result that it made short work of the biggest pieces of ore we put into the hopper. You might say how long you would take to deliver another of the same size."

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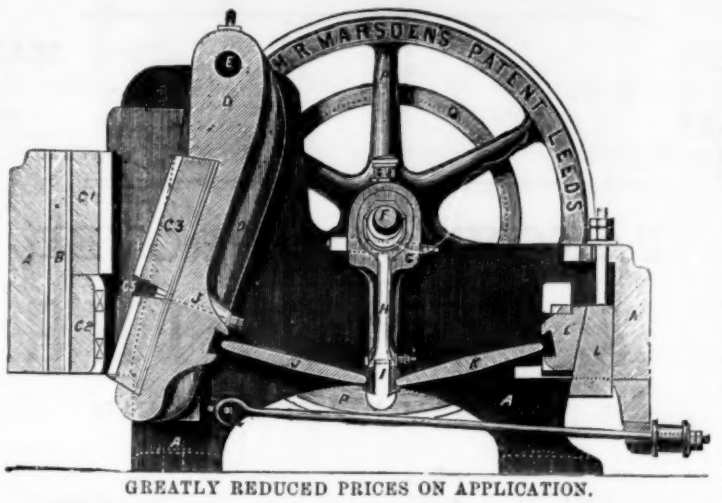
"I am sure the machine will be a success, and a great one, and there is any amount of demand for such a machine. We can work it with 20 lbs. of steam, and our engine, which is a 12-h.p., plays with the work, in fact we run the Stonebreaker and the Pulverizer both together with 35 lbs."



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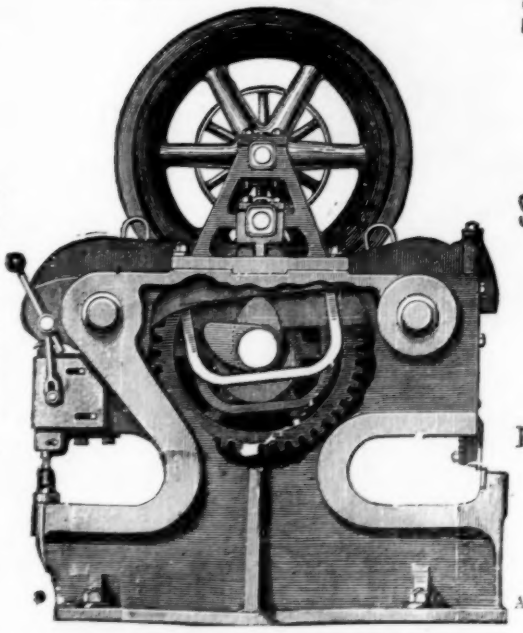

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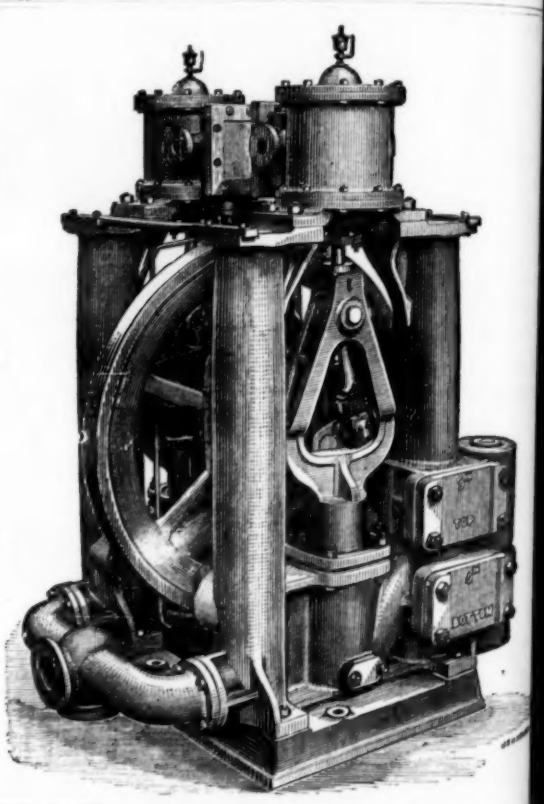

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